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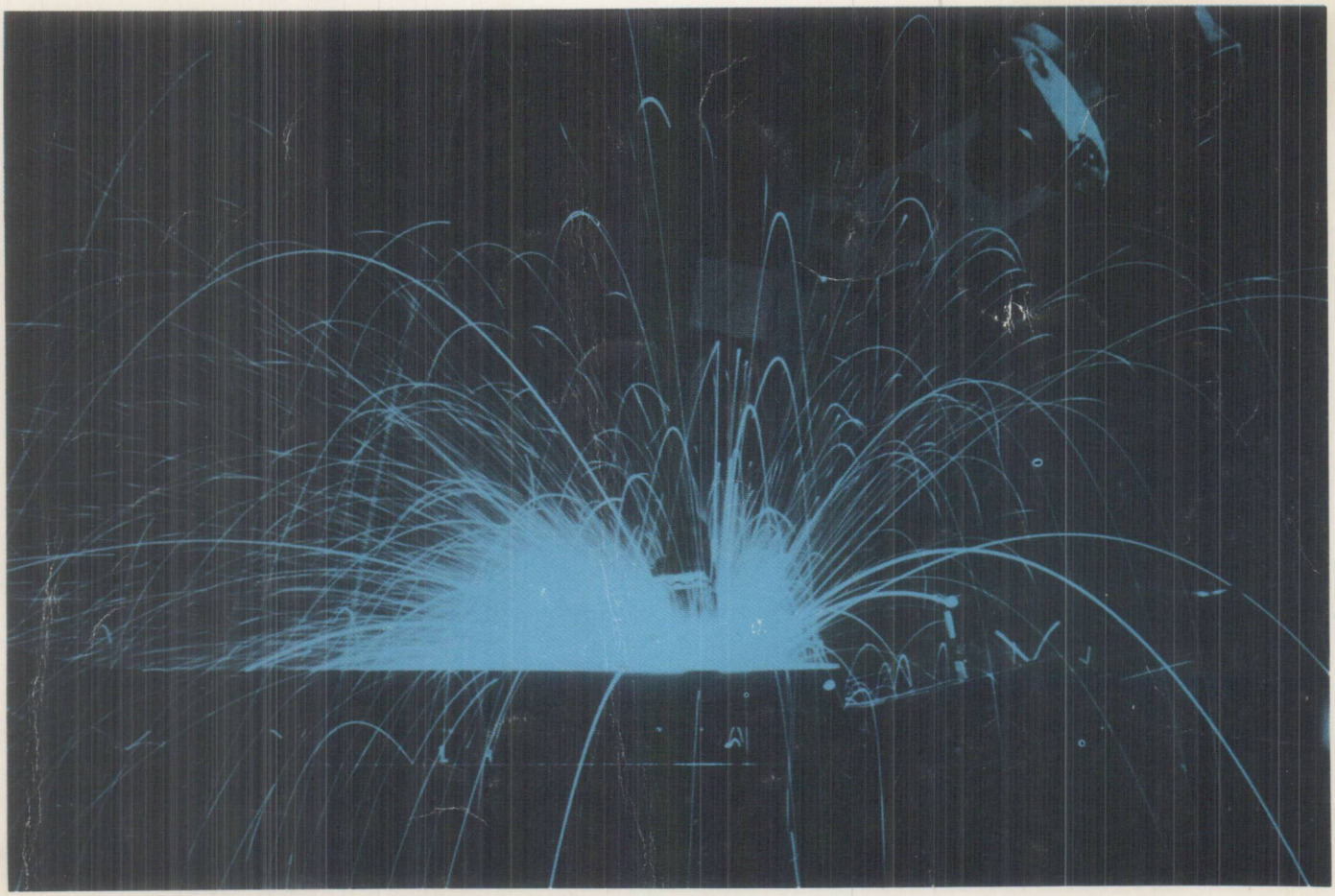
Energy Information Administration

Manufacturing Energy Consumption Survey: Consumption of Energy, 1985



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Manufacturing Energy Consumption Survey: Consumption of Energy, 1985

Energy Information Administration
Office of Energy Markets and End Use
U.S. Department of Energy
Washington, DC 20585

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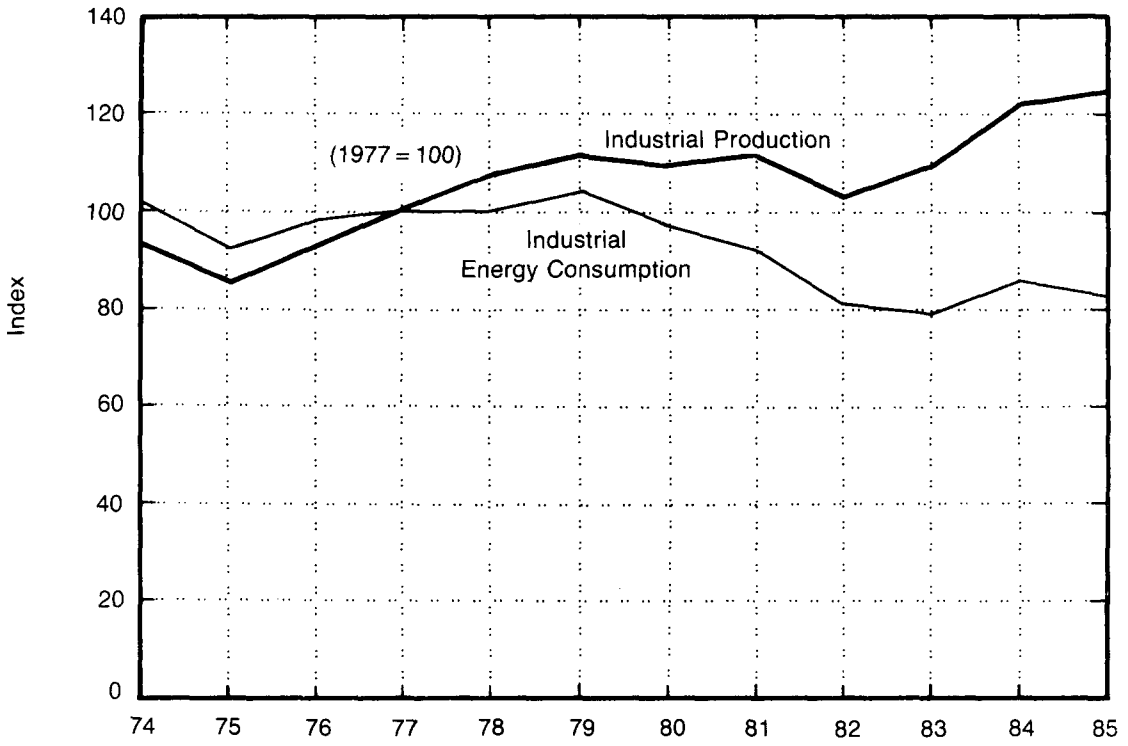
Introduction

In recent years, industrial consumption of energy in the United States has been declining despite increasing industrial output (Figure 1). Nevertheless, total net energy consumption by the entire industrial sector was 20.4 quadrillion Btu (quads) in 1985, which was 37 percent of the U.S. total for the residential, commercial, transportation, and industrial sectors[1] (Figure 2). A clearer understanding of how energy is used in the industrial sector can help the Nation anticipate how future expansion of and change in the U.S. industrial base might affect future energy requirements. The Manufacturing Energy Consumption Survey (MECS) is designed to contribute to this understanding.

Figure 1. Indices of Industrial Energy Consumption and Industrial Production for 1974 Through 1985



Sources: U.S. Bureau of the Census, *Statistical Abstract of the United States: 1987* (Washington, DC, 1986), Table 1311, and the Energy Information Administration, *Monthly Energy Review*, November 1987, DOE/EIA 0035 (87/11) (Washington, DC, February 1988), Table 2.4.

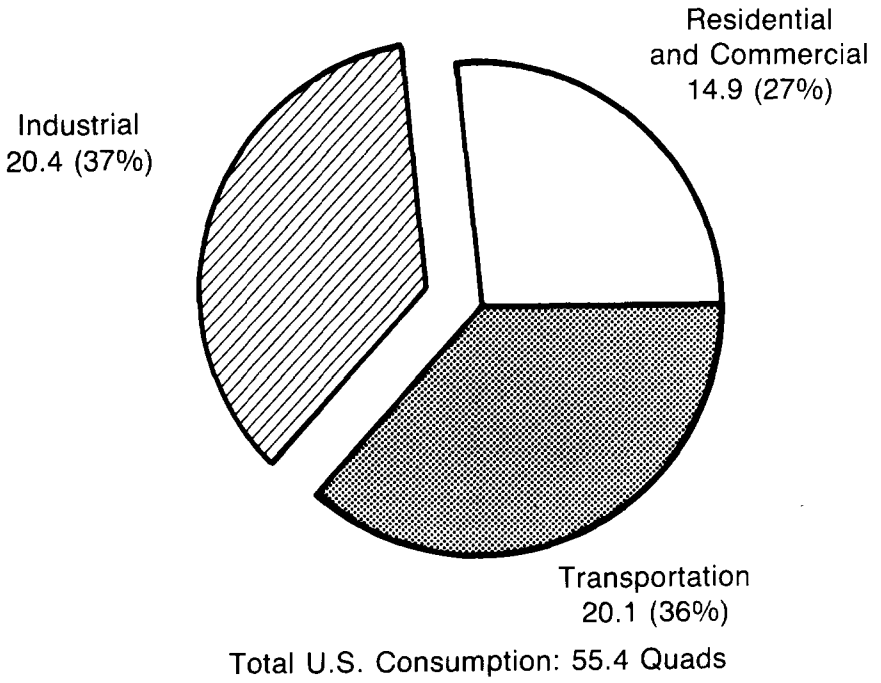
[1]The "industrial sector" consists of manufacturing, mining, construction, agriculture, fishing, and forestry activities.

This report, the first of a series based on the 1985 MECS, provides a comprehensive description of energy consumption by manufacturing industries in the United States. The MECS is the first survey conducted by the Energy Information Administration (EIA) to collect detailed data on energy use by manufacturing industries. The MECS does *not* include energy consumption by mining, agriculture, construction, and electric utilities. Energy consumption by manufacturers is approximately 80 percent of the consumption of the entire industrial sector.

The 1985 Manufacturing Energy Consumption Survey was conducted under the authority of the Federal Energy Administration Act of 1974, Public Law 93-275, as amended. Subsequent surveys will be conducted every 3 years under the authority of Section 310(a) of the Omnibus Budget Reconciliation Act of 1986, Public Law 99-509. The Industry Division of the Bureau of the Census serves as EIA's collection and compiling agent for the MECS. All reports submitted to the Bureau of the Census are confidential under the provisions of Section 9, Title 13, of the U.S. Code.

The MECS data base provides the necessary information to estimate the use of energy for the heat, power, and electricity generation. The use of fuels (such as crude oil and natural gas) as raw material input to manufacturing processes is also covered in the survey. This publication presents these basic energy consumption estimates along with statistics on the cogeneration of electricity, fuel storage capabilities, and prices manufacturers paid for energy. Estimates of fuel-switching capabilities will be presented in a separate EIA report.

Figure 2. Total 1985 U.S. Consumption of Energy by End-Use Sector



Note: Electrical energy losses are not included.

Source: Energy Information Administration, *Monthly Energy Review*, November 1987, DOE/EIA-0035 (87/11) (Washington, DC, February 1988), Table 2.2

Surveying the Manufacturing Sector

The Manufacturing Sector Consists of Business Establishments that Produce Goods

The manufacturing sector is composed of establishments that transform material or substances into new products using mechanical or chemical processes. These products may be final products that consumers will purchase, such as an automobile or a chair. Manufacturers also produce intermediate goods that will be used by other manufacturers, such as parts for automobile engines or rolls of upholstery fabric.

An establishment is generally at a single location and is often referred to as a plant, factory, or mill. It ordinarily uses power-driven machines and equipment for handling materials. A manufacturing establishment may also assemble components or perform blending operations. Electric utilities, mining operations, agriculture, and construction are *not* included in the manufacturing sector.

Establishments are classified into industry categories based the system of Standard Industrial Classification (SIC) developed by the Office of Management and Budget.[2] Each establishment is placed in a category associated with the type of good it produces. If an establishment manufactures more than one type of good, it will be classified according to its primary product. An establishment, for example, that is primarily engaged in manufacturing paper from wood pulp, and also manufactures paperboard, would be classified in the paper mill industry (SIC 2621). It would not be classified in the paperboard mill industry (SIC 2631).

MECS Samples Establishments in All the Major Manufacturing Groups and the Most Energy-Intensive Industries.

The estimates in this report are based on data collected from a carefully designed sample of manufacturing establishments. Several important considerations were included in the criteria for the design of the sample. First, the sampling procedures ensured that all manufacturing establishments were represented. Also, the size of the sample in each industry group was controlled so that the error levels of the survey estimates would be similar for each group.

The MECS sample was selected as a subset of the mail sample for the Annual Survey of Manufactures (ASM), conducted by the Bureau of the Census. The ASM mail sample is comprised of 56,000 manufacturing establishments drawn from the approximately 225,000 establishments in the Census of Manufactures mail file. A sample of about 12,000 establishments from the ASM was used for MECS. (See Appendix A for a detailed discussion of the procedures followed to determine the MECS sample.) Establishments were selected from each of the 20 major industry groups (two-digit SIC code) that make up the manufacturing sector. In addition, establishments were selected from the 10 specific industries (four-digit SIC code) that historically have consumed the most energy. Appendix D contains a description of these 30 groups.

This report presents estimates of energy use for selected groups of manufacturing industries. These estimates are based on data that MECS collects from individual manufacturing establishments. The data that have been collected are the amounts of energy the establishment uses for all its operations. The energy use estimates reported in this publication are the total amounts of energy used by all establishments within a group. No estimates are provided for the amount of energy used to manufacture a specific product. In the example mentioned earlier, all energy consumed by the paper mill establishment would be included as consumption for the paper mill industry. The energy that the establishment consumed to produce paperboard, which was not the establishment's primary product, would also be included in the energy consumption that was assigned to the paper mill industry.

Measures of Energy Consumption for Manufacturing Industries

Measuring energy consumption in most sectors of the economy is relatively straightforward. For example, a

[2]Office of Management and Budget, *Standard Industrial Classification Manual, 1972* (Washington, DC, 1982).

household will consume energy to heat its living area, cook its food, run its appliances, and so on. All of the energy that comes into the housing units is used up and is considered consumption.

The use of energy by manufacturing industries is much more complex. Most of the energy is actually consumed, but some may be transformed into other products (including other fuels), and useful energy may be produced as a byproduct during some manufacturing processes. To deal with this complexity, three methods for measuring energy consumption are considered in this report (see box below).

- The first measure is **primary energy consumption**, which is the *total energy requirements* (including raw material inputs) of manufacturing industries necessary to *produce nonenergy goods.*
- The second measure is **total fuel consumption**--the total amount of energy used to *produce heat and power and to generate electricity*. Total fuel use differs from primary consumption in that it does *not* include raw material (feedstock) inputs.
- The third measure is **total purchased fuels and electricity** used to *produce heat and power and to generate electricity*. This measures the amount of energy *purchased from offsite sources* that is consumed for heat, power, and electricity generation. It does *not* include byproduct fuels used in the manufacturing process, which are included in total fuel use.

This report also provides statistics on total primary consumption used specifically for nonfuel purposes--that is, as feedstock or raw material input.

Total primary energy consumption for manufacturing industries was 17.5 quads in 1985 (Figure 3). Of this amount, 5.0 quads were consumed as raw material inputs for nonfuel purposes. *Total fuel consumption* was 13.6 quads, while *total purchased fuels and electricity* consumption was 9.7 quads. (The sum of total fuel consumption and raw material inputs is greater than total primary consumption. Some byproduct fuels are obtained from raw material inputs that are included in

Three Methods for Measuring Energy Use with MECS Data

1. **Total Primary Energy Consumption** was 17.5 quadrillion Btu (quads) in 1985. This is the total amount of energy required to produce nonenergy goods. It is composed of:

   13.6 quads of **Total Fuel Consumption**, the total amount of energy used to produce heat and power and to generate electricity, ***plus***

   5.0 quads of raw material (feedstock) inputs, ***less***

   1.1 quads of byproduct fuels resulting from raw material energy inputs that were counted in total fuel consumption.

2. **Total Fuel Consumption** was 13.6 quads in 1985. This is the total amount of energy required to produce heat and power and to generate electricity by manufacturers. It is composed of:

   9.7 quads of **Total Purchased Fuels and Electricity** used to produce heat and power and to generate electricity, ***plus***

   1.1 quads of fuels that are byproducts of the manufacturing process, resulting from the use of energy products used as raw material inputs (these fuels include blast furnace gas, coke oven gas, and chemical byproducts), ***plus***

   2.8 quads of fuels that are byproducts of the manufacturing process, resulting from the use of nonenergy inputs (these fuels include wood chips and wood waste, pulping liquor, chemical byproducts, still gas, and petroleum coke).

3. **Total Purchased Fuels and Electricity** was 9.7 quads in 1985. These are offsite-produced fuels and electric energy used by manufacturers to produce heat and power and to generate electricity. This measure of consumption is comparable to the ASM measure of Purchased Fuels and Electric Energy obtained in earlier supplements to the ASM.

total fuel consumption. See below for a further discussion of this point.) A more detailed discussion of these measures of energy consumption, as well as a summary of some of the findings of the MECS, are contained in the next section. The tables in the report provide detailed consumption estimates for each of these measures. A summary of some of the most important estimates are presented in Table S1.

Overview of the Findings

First Measure of Consumption

Total Primary Energy Consumption for All Purposes by the Manufacturing Sector Exceeds 17 Quads in 1985

During 1985, the total *primary energy consumption* by the manufacturing industries was 17.5 quads. This energy was used to produce heat and power and to generate electricity, and used as raw material input for manufacturing processes. Energy sources used as material inputs to manufacturing processes accounted for 5.0 quads, or 29 percent of the total.

In this report, the term *primary energy consumption* has a specific meaning. It is the total amount of energy consumed to produce nonenergy goods. Raw material inputs (such as crude oil) that are used to manufacture fuel products (such as gasoline) are not included in primary consumption. These fuels are included in the consumption statistics of the economic sector that ultimately consumes the fuels. Counting them in the consumption of the manufacturing sector would result in double counting.

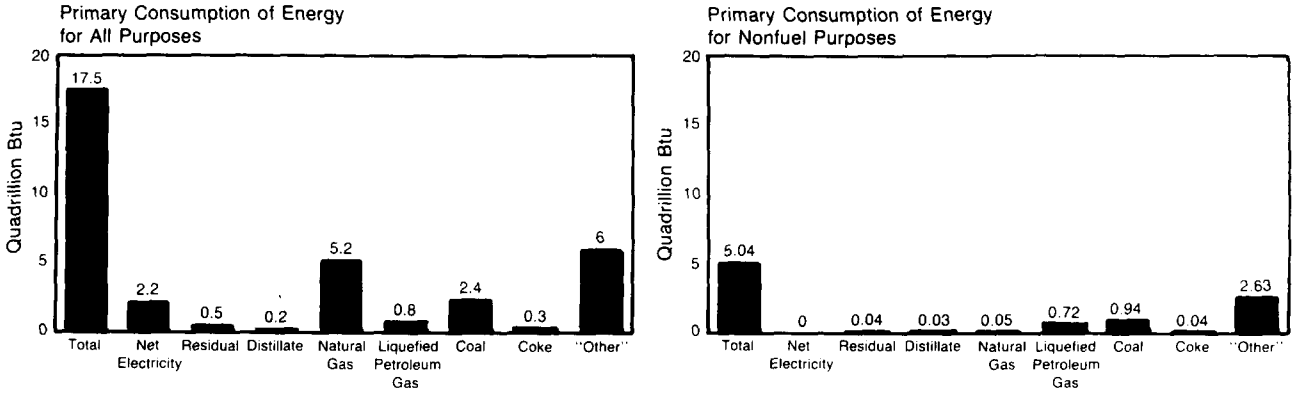
Measuring primary consumption by manufacturing industries is complicated by the many ways energy is used and transformed to produce goods. For example, fuels may be produced as a byproduct of a manufacturing process, and then consumed onsite. To ensure that there is no double counting incurred in measuring primary consumption, each manufacturing process is carefully considered to ensure that energy use is counted only once. (See the box on page 7 for a further discussion of the procedures followed to measure primary energy consumption.)

Table S1. Summary of Energy Consumption Measures for the Manufacturing Sector, 1985
(Quadrillion Btu)

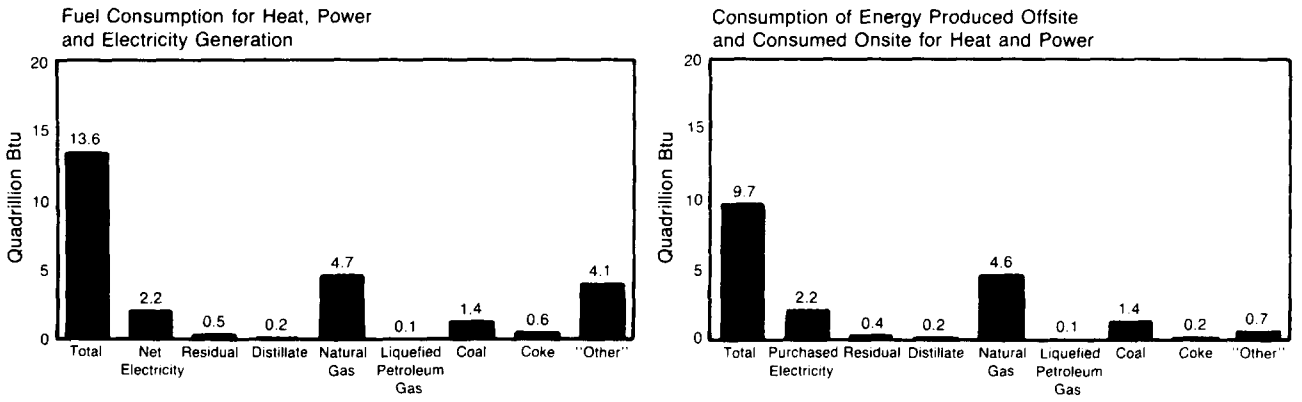
Type of Consumption and Selected Industries	Total		Electricity	Fuel Oil	Natural Gas	Coal	Other[a]
	Quads	Percent					
Primary Energy Consumption[b]							
Paper and Allied Products	2.21	12.6	0.18	0.17	0.41	0.31	1.15
Chemicals and Allied Products	3.57	20.4	0.41	0.13	1.68	0.33	1.02
Petroleum and Coal Products	5.12	29.2	0.11	0.14	0.72	0.01	[c] 4.16
Primary Metals	2.63	15.0	0.48	0.05	0.69	1.13	0.27
All Other Manufacturing Industries	3.99	22.8	0.99	0.27	1.67	0.60	0.44
Total	17.52	100.0	2.17	0.76	5.17	2.38	7.05
Fuel Consumption to Produce Heat, Power, and Electricity[d]							
Paper and Allied Products	2.20	16.2	0.17	W	0.40	0.34	W
Chemicals and Allied Products	2.41	17.7	0.40	0.09	1.19	0.35	0.38
Petroleum and Coal Products	2.63	19.3	0.11	0.12	0.72	0.01	1.67
Primary Metals	2.39	17.5	0.47	0.05	0.69	0.09	1.09
All Other Manufacturing Industries	3.99	29.3	0.99	W	1.66	0.64	W
Total	13.62	100.0	2.11	0.69	4.66	1.43	4.73
Purchased Fuels and Electricity to Produce Heat, Power, and Electricity							
Paper and Allied Products	1.34	13.8	0.19	0.17	0.40	0.34	0.28
Chemicals and Allied Products	2.17	22.4	0.43	0.09	1.15	0.33	0.20
Petroleum and Coal Products	0.92	9.5	0.12	0.02	0.70	0.01	0.06
Primary Metals	1.54	15.9	0.48	0.05	0.69	0.09	0.22
All Other Manufacturing Industries	3.72	38.4	1.01	0.26	1.66	0.66	0.09
Total	9.69	100.0	2.23	0.59	4.60	1.42	0.85

[a] "Other" includes all other types of energy that respondents indicated were consumed.
[b] Includes feedstocks; does not include byproduct fuels.
[c] Includes feedstocks and raw materials for the production of nonenergy products, such as asphalt, regardless of the type of energy.
[d] Includes byproduct energy.
W = Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Note: Totals may not equal sum of components because of independent rounding.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Figure 3. Energy Consumption in the Manufacturing Sector for 1985



Note: The sum of "Fuel Consumption" and "Primary Energy Consumption for Nonfuel Purposes" does not equal "Total Primary Energy Consumption for All Purposes." Some nonfuel consumption results in byproduct fuels which are included in "Fuel Consumption."



Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846 (F), "1985 Manufacturing Energy Consumption Survey."

Natural gas was the type of energy most intensively used as a fuel or raw material input in 1985. It accounted for 5.2 quads, or 30 percent of total primary energy consumption in the manufacturing sector. This amount corresponds to about 5.0 thousand cubic feet. Most of the natural gas was consumed as a fuel, with nonfuel consumption accounting for only 0.5 quads.

Coal was the next most heavily consumed fuel by the manufacturing sector in 1985. It accounted for 2.4 quads, 14 percent of total primary consumption. This amount corresponds to about 98 million tons of coal. Nearly 40 percent of the coal consumption was as a raw material input for the production of coke by the blast furnace and steel mill industry.

"Net" electricity consumption came next, accounting for 2.2 quads, or 12 percent of primary consumption. ("Net" electricity consumption excludes electricity that was generated or cogenerated onsite using fuels as inputs.)

Measuring Primary Energy Consumption Requires Careful Attention to the Ways Energy is Consumed and Produced

Energy transformations occur throughout the manufacturing sector. Care must be taken in measuring *primary energy consumption* to ensure that all energy use is accounted for, and that no double counting occurs. Some important situations that affect measurement of *primary energy consumption* are electricity generation by manufacturing establishments, byproduct fuels from manufacturing processes, and energy inputs to refineries. The approaches taken for these situations are discussed in the following paragraphs.

Whether or not electricity generated by an establishment is included in primary consumption depends upon the method used to generate it. If a combustible fuel (such as coal or natural gas) is used, the electricity is not counted in primary consumption, but the fuel consumed to generate it is counted. When the electricity is generated from a renewable resource (such as hydropower or wind) it is included in primary consumption, because the energy content of the renewable resource cannot be measured.

Steel mills and coke plants use coal as a raw material input for coking and may purchase fuels to fire blast furnaces and coke ovens. These energy uses are counted as primary consumption. Blast furnace gas and coke oven gas, which are byproducts of the coking and steelmaking operations, may also be consumed onsite. This consumption is not included in primary consumption because the energy content of these gases has already been counted by including the energy content of the coal.

The wood used in pulp and paper plants is not considered to be an energy input and is not included in primary consumption. However, wood chips, bark, and other wood waste are produced in preparing the wood for pulping. Also, chemical pulping produces a residue known as black liquor or pulping liquor. All of these byproducts are commonly consumed as fuels in these plants. The energy content of the byproduct fuels that are burned onsite is included in primary consumption.

Petroleum is a closely monitored and strategically important part of the U.S. energy economy. It is essential that all petroleum use be accounted for in a consistent manner. Much of the output of petroleum refineries is sold to other consumers as fuels. Consequently, measuring consumption of refineries based on crude oil and other unfinished petroleum inputs is not feasible. Instead, MECS deals with petroleum consumption by focusing on the product outputs from refining, all of which have a measurable energy content. Most refinery products (such as gasoline, fuel oil, or kerosene) are produced to be shipped offsite for use as fuels by others. These products are not counted as primary consumption by refineries, except for the relatively small quantities that are used by refineries themselves as fuel. These products are counted as primary consumption in the sectors that receive and consume them.

Still gas, petroleum coke, and other byproducts that result from refining and are consumed onsite are counted as primary consumption at refineries. In addition, some goods produced by refineries are not used as fuels by their consumers. These products include asphalt, waxes, lubricants, and solvents. The energy content of these products is counted as primary consumption for refineries and is included in the "other" energy category.

Petroleum products such as liquefied petroleum gases (LPG), residual fuel oil, and distillate fuel oil were less important in the manufacturing sector in 1985 for primary consumption. (Petroleum is, of course, a significant raw material input for refining industries, but this use is not included in primary consumption.) Altogether, these products accounted for approximately 1.6 quads, or less than 9 percent of the total primary consumption of energy for all purposes. The most heavily consumed of the three was LPG, which accounted for 0.8 quads. Nearly 90 percent of the LPG was consumed as a raw material input.

The category labeled "other" comprises the remaining fuels used by manufacturing industries. "Other" fuels accounted for approximately 6.0 quads of total primary

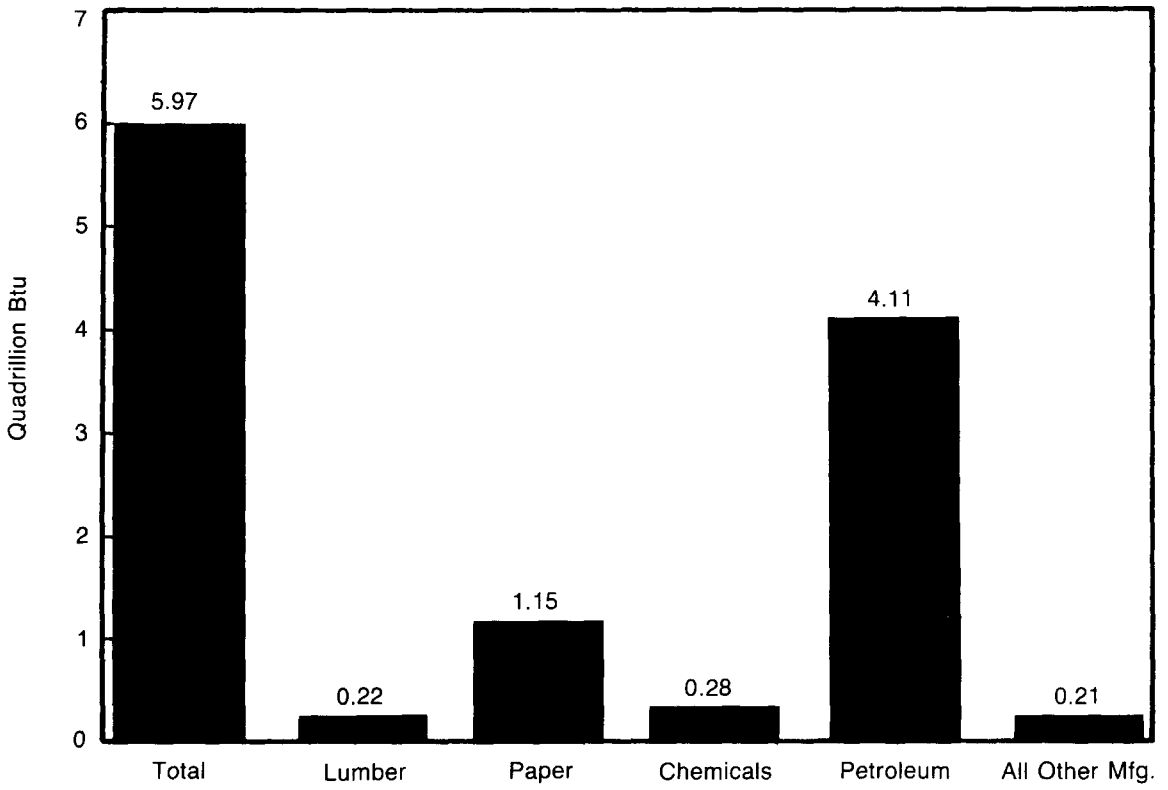
consumption in 1985 (Figure 4). This category represents a large portion (34 percent) of primary consumption; it is composed of a variety of miscellaneous fuels and raw material inputs whose use is too scattered to be reported individually, including large amounts of:

- Wood waste and pulping liquor consumed by the lumber and by the paper and allied products industries
- Byproduct fuels derived from the processing of crude oil and other unfinished oils at petroleum refinereis that were consumed onsite
- Petroleum products which are refined from crude oil and other inputs, but which are not consumed for their energy content (such as asphalt, waxes, lubricants, and solvents.

Petroleum Refining and Chemical Industries Account for Nearly 50 Percent of Primary Energy Consumption

The petroleum and coal products industry was the single largest consumer of primary energy in 1985, accounting for 5.1 quads (Figure 5). The chemical and allied products industry was second, with 3.6 quads. Together, those two industries had a total primary consumption of 8.7 quads, 49 percent of the total primary consumption by the manufacturing sector.

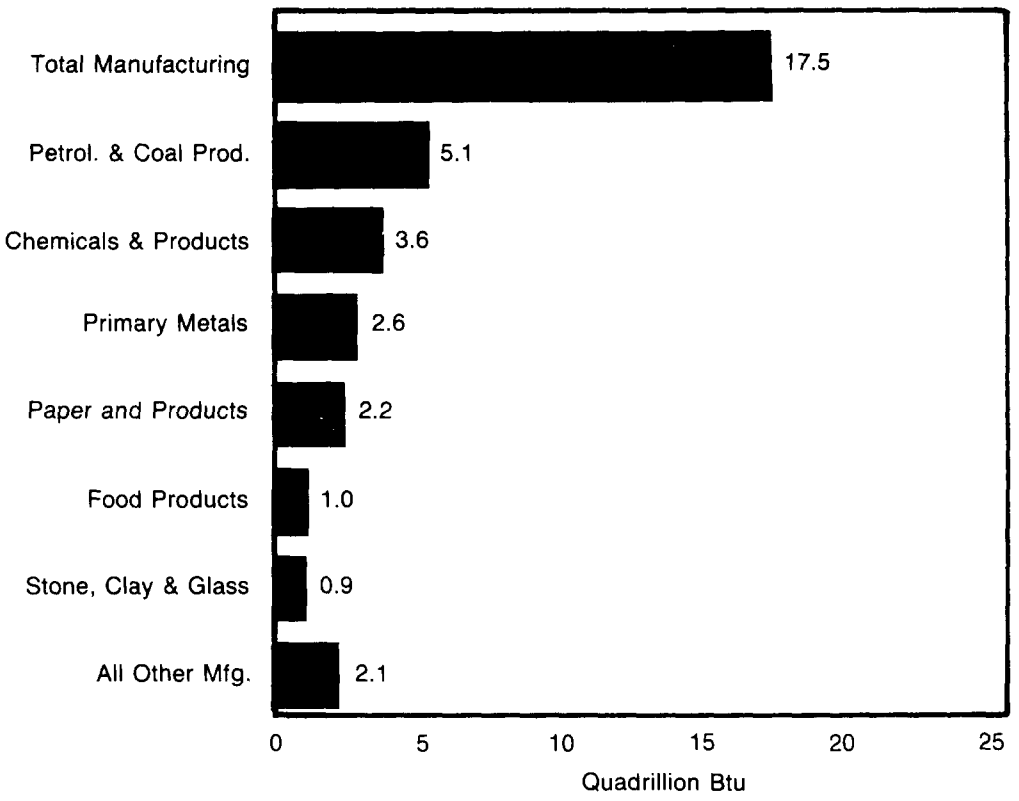
Figure 4. Primary Consumption of Other Energy by Manufacturers in 1985



Note: "Other" Energy consists of all types of energy besides net electricity, residual and distillate fuel oils, natural gas, LPG, coal and coke and breeze.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846 (F), "1985 Manufacturing Energy Consumption Survey."

Figure 5. Primary Consumption of Energy by Selected Manufacturing Industries in 1985



Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846 (F), "1985 Manufacturing Energy Consumption Survey."

The third largest industry, in terms of primary consumption, was the primary metals industry, which consumed 2.6 quads. Within that industry, blast furnaces and steel mills consumed 1.9 quads, and primary production of aluminum required 0.2 quads.

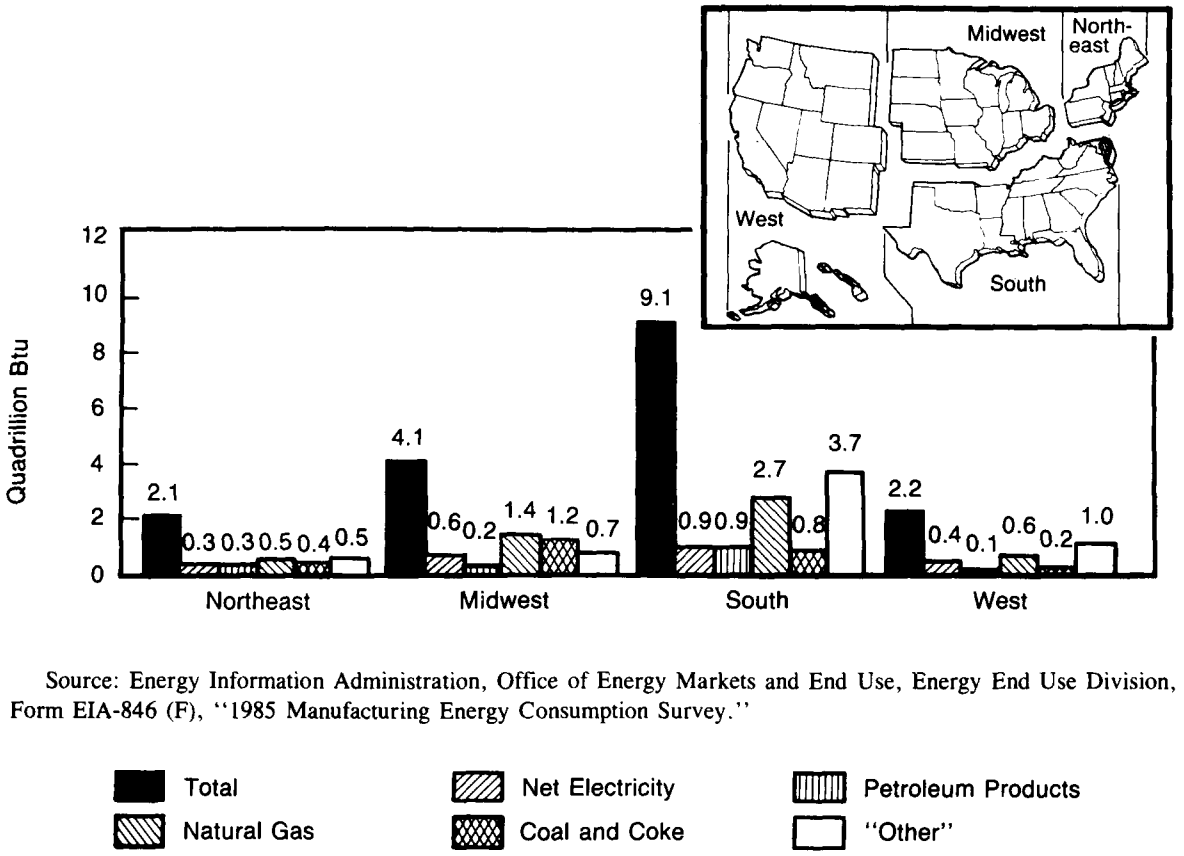
Paper and allied products was the fourth largest, with 2.2 quads. This industry consists of establishments that produce pulp, paper, and paperboard, as well as containers and building paper.

Food processing in the United States required 1.0 quads in 1985, as did the stone, clay, and glass products industry. All other industries combined consumed 2.1 quads.

South Census Region Leads Nation in Primary Energy Consumption

The South Census Region, consisting of 16 States and the District of Columbia (see map in Appendix E), accounted for nearly 9.1 quads of primary energy consumption in 1985 (Figure 6). That consumption represented nearly 52 percent of the Nation's total primary consumption. Of that total, 3.0 quads, or 33 percent, were consumed consumed as a raw material input. The

Figure 6. Primary Consumption of Energy by Manufacturers in Census Regions for 1985



Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846 (F), "1985 Manufacturing Energy Consumption Survey."

percent of total primary consumption as a raw material input is slightly higher in the South than in the entire United States because of the heavy concentration of petroleum refineries and petrochemical plants in Louisiana, Texas, and Oklahoma.

The South Census Region also leads the Nation in the total consumption of natural gas with 2.7 quads, or 53 percent of 1985 U.S. total primary consumption. The Midwest Census Region consumed 1.4 quads of natural gas, and the Northeast and West regions accounted for an additional 0.5 quads each.

In addition, the South Census Region consumed greater quantities of petroleum products (LPG, distillate, and residual fuel oil) than all of the rest of the Nation combined. The total consumption of these products was 0.9 quads, or 58 percent of the total. Of these 0.9 quads, however, 0.6 quads are the LPG, which is heavily consumed as a raw material input by the petrochemical industry.

Second Measure of Consumption

Total Fuel Consumption (for Producing Heat and Power and Generating Electricity) was Nearly 14 Quads in 1985

The second measure of energy consumption considered in analyzing the MECS findings is *total fuel consumption*, the amount of energy used to produce heat and power and to generate electricity during manufacturing operations (see box below). Energy consumed for these purposes is often referred to as "fuel" use, even though it includes the consumption of purchased electricity and steam, which are not combustible and, therefore, are not technically fuels. *Total fuel consumption,* excludes energy that is used as feedstock or raw material inputs to the production process. In 1985, total fuel consumption for manufacturing industries totaled 13.6 quads. *Total fuel consumption* measures the energy required to operate machinery, to fire boilers, and to conduct all other operations that take place at the manufacturing site (including activities incidental to the manufacturing process, such as heating, lighting buildings, and fueling onsite vehicles). Fuel use for these operations occurs not only through primary consumption of energy, but also through consumption of various fuels produced onsite as byproducts.

Byproduct energy accounted for a substantial amount of total fuel consumption. The MECS recognizes two types of byproduct fuels: (1) those resulting from the use of other energy inputs (2) those resulting from the use of nonenergy inputs.

The paper and allied products industry consumed 0.7 quads of byproduct energy, most of which was pulping liquor, wood chips, bark, and wood waste. These fuels originate from the wood used in the pulping process, which is not counted in the MECS as a primary energy input, as discussed above.

The petroleum refining industry is also a heavy consumer of byproduct fuels. Most of these fuels originate from crude oil and consist primarily of still gas and petroleum coke. Because the crude oil consumed by petroleum refineries is excluded in the MECS, those fuels are classified as resulting from nonenergy inputs. Still gas, consisting of a mixture of methane, hydrogen, ethane, and other light gasses (see Glossary), is the principal byproduct fuel produced at petroleum refineries. In 1985, still gas accounted for 1.2 quads, or approximately 45 percent of the total fuel requirements of refineries.

Finally, the blast furnace and steel mill industry is also a heavy consumer of byproduct fuels. Coke oven gas, the dominant byproduct fuel in that industry, ac-

Total Fuel Consumption Measures Energy Consumed for Operations

The energy used by manufacturing establishments to produce heat and power and to generate electricity is often referred to as total "fuel use." *Total fuel consumption*, used in this sense, includes selected electricity and steam consumption, although these are not combustible and so are not technically fuels. *Total fuel consumption* is a complete measure of energy consumption, because it measures all the energy required to carry out the manufacturing process, excluding the energy consumed as raw material input. As with primary consumption, total fuel consumption is estimated carefully to avoid double counting using procedures similar to those for measuring primary consumption.

The *total fuel consumption* of a manufacturing establishment can be met through primary consumption of energy as fuel and also through the consumption of onsite-produced byproduct fuels. These byproduct fuels result from the use of other energy inputs as raw materials. Combining both these types of consumption provides a measure of the total fuel requirements for manufacturing, regardless of the origin of the fuels.

Tables 1 and 2 in the report provide estimates of total primary energy consumption, while estimates of total fuel consumption appear in Table 3 and 4. Adding the fuel consumption estimates in Table 3 to the estimates of consumption for nonfuel purposes in Table 5 produces values that are greater than the primary consumption estimates in Table 1. The difference represents the quantity of byproduct fuels produced from the consumption of other energy inputs.

counted for 0.5 quads, or 28 percent of the total fuel requirements for the production of pig iron and steel. Coke oven gas results from the destructive distillation of coal and, therefore, represents energy produced from the consumption of another energy input.

Third Measure of Consumption

Total Purchased Fuels and Electricity Declined by 16 Percent Between 1981 and 1985.

A third measure of energy consumption used in the MECS is the amount of fuels and electric energy that are purchased by the establishment. As with total fuel consumption, *total purchased fuels and electricity* includes fuels used to produce heat and power and to generate electricity, and it excludes raw material inputs. This measure corresponds to data collected and published by the Bureau of the Census in conjunction with the ASM (see box below).

For 1981, the Bureau of the Census estimated that 11.6 quads of purchased fuels and electric energy were consumed by the manufacturing sector (Figure 7). According to the MECS, this consumption declined to 9.7 quads in 1985, for a decrease of 1.9 quads, or 16.4 percent. During the same time period, real output in U.S. manufacturing increased by 14.4 percent. This implies an improvement in purchased-fuel conservation of nearly 37 percent in the short space of 4 years.

The decrease in purchased energy consumption occurred in all four Census regions. The greatest relative decrease occurred in the Northeast Region where total purchased consumption decreased 31 percent from 1.9 to 1.3 quads from 1981 through 1985.

Significant changes also occurred in the types of energy purchased between 1981 and 1985. Residual fuel oil consumption recorded the greatest decline: from 120.8 to 64.6 million barrels, a decrease of 47 percent. The consumption of coke and breeze declined from 14.8 to 8.7 million short tons, a decrease of 41 percent. Natural gas declined from 5.4 to 4.5 trillion cubic feet, representing a decrease of 18 percent. The only "purchased" fuel to register an increase was coal; its 1981 estimate was 52.9 million short tons, and the 1985 estimate was 58.6, an increase of 11 percent. The estimates of purchased electricity and LPG were nearly equal for 1981 and 1985.

Other Energy Measures

Manufacturing Sector Cogenerates 70 Billion Kilowatthours of Electricity

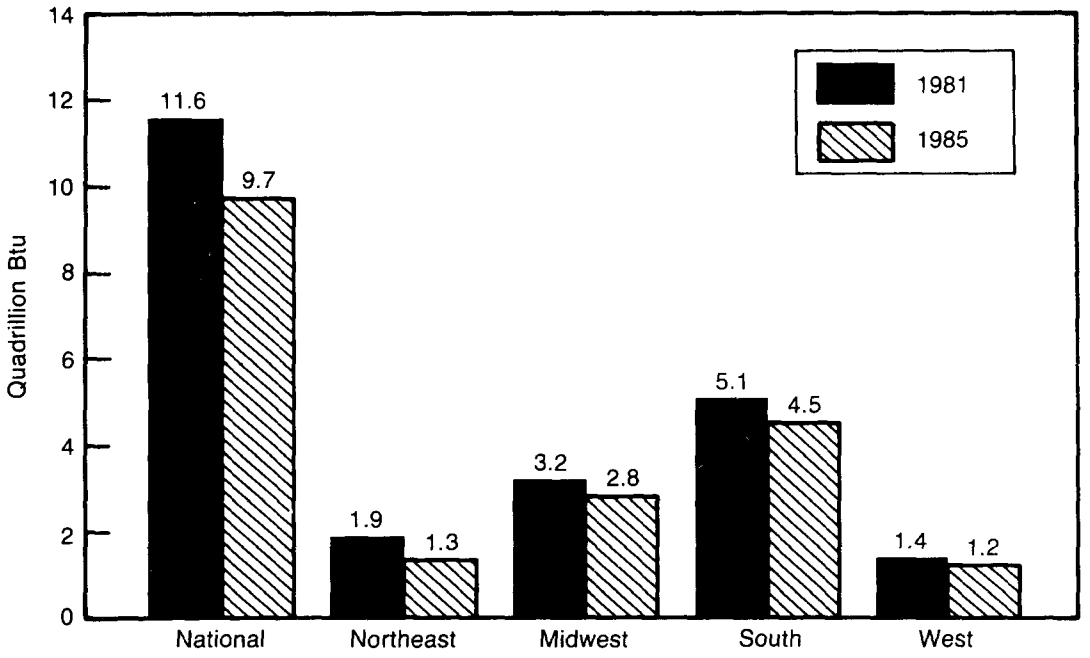
For the purposes of MECS, electricity cogeneration is defined as the production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy. In 1985, the manufacturing sector cogenerated 69.8 billion kilowatthours of electric power (Table 9).

Estimates of Purchased Fuels and Electric Energy Continue a Bureau of the Census Data Series

During the years 1974 though 1981, the U.S. Department of Commerce, Bureau of the Census collected and published data on the consumption of "purchased fuels and electric energy" as a supplement to the ASM. A "purchased" fuel was defined as "... any substance that was purchased or transferred from outside the defined boundaries of the establishment in which it was consumed for the production of heat, power, and generated electricity." Purchased electricity was similarly defined in the ASM. The Bureau of the Census data collection activity was discontinued after collection of the 1981 data.

The MECS provides the capability of producing estimates that are definitionally equivalent to those published by the Bureau of the Census. The MECS estimates are based on "derived" values of purchases and acquisitions by transfer (see Appendix A, Development of the Data File and Survey Estimates) and represent "offsite-produced" energy. These estimates appear in Tables 7 and 8 of this report.

Figure 7. Total Consumption by Manufacturing of Energy Produced Offsite (Comparison of 1981 and 1985 by Region)



Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846 (F), "1985 Manufacturing Energy Consumption Survey."

Electricity cogeneration is heavily concentrated in two industry groups. Paper and allied products produced 32.9 billion kilowatthours and chemicals and allied products produced 19.8 billion kilowatthours. These two industrial groups accounted from approximately 76 percent of the total electricity cogenerated by the manufacturing sector.

Most cogeneration activitiy took place in the South Census Region. That region alone produced 44.3 billion kilowatthours of cogenerated electric power, or 64 percent of the total. This high percentage was due primarily to the heavy concentration of paper mills and chemical plants in the area.

Price Manufacturers Pay for Electricity is 6.5 Times Their Price for Coal

Nationally, the price manufacturing establishments paid for electricity was $13.92 per million Btu (Table 12). The price of coal, on the other hand, was only $2.14 per million Btu. Thus, electricity was approximately 6.5 times as expensive as coal for the same heat content.

The price of electricity for manufacturing industries was fairly constant across all Census regions, except for the Northeast, where is cost $17.05 per million Btu.

The price of coal was about the same in all four Census regions.

Nationally, the average prices manufacturers paid for natural gas and residual fuel oil were $3.72 and $4.33 per million Btu, respectively. Natural gas was most expensive in the Northeast Census Region, $4.65, and least expensive in the South Census Region, $3.31. There was no significant difference between the prices of natural gas in the Midwest and West Census Regions.

Detailed Statistics Tables

Table 1. Total Primary Consumption of Energy for All Purposes by Census Region, Industry Group, and Selected Industries, 1985

Part 1. (Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke and Breeze (1000 short tons)	Other[c] (trillion Btu)
					Total United States					
20	Food and Kindred Products	949	44,417	6,290	4,362	464	89	5,571	122	121
21	Tobacco Manufactures	19	1,225	308	55	3	1	407	0	*
22	Textile Mill Products	248	25,552	2,858	929	89	24	1,631	0	8
23	Apparel and Other Textile Products	31	4,030	165	372	11	4	70	0	*
24	Lumber and Wood Products	325	13,753	W	3,976	24	W	W	0	224
25	Furniture and Fixtures	48	4,220	145	342	18	8	89	0	9
26	Paper and Allied Products	2,211	51,948	24,727	2,048	393	56	14,015	0	1,146
2621	*Paper Mills, Except Building Paper*	997	29,012	12,567	1,054	153	24	8,315	0	469
2631	*Paperboard Mills*	770	9,471	6,829	230	129	5	4,626	0	458
27	Printing and Publishing	76	11,184	93	256	31	11	36	0	3
28	Chemicals and Allied Products	3,567	119,448	16,499	4,409	1,627	8,433	14,957	533	280
2819	*Industrial Inorganic Chemicals*	312	32,857	1,248	541	122	4	2,007	533	5
2821	*Plastics Materials and Resins*	573	11,907	863	258	166	3,247	1,281	0	46
2869	*Industrial Organic Chemicals*	1,115	16,524	3,440	819	511	3,749	4,248	0	87
2873	*Nitrogenous Fertilizers*	479	3,956	W	27	449	W	0	0	W
29	Petroleum and Coal Products	5,123	33,254	18,586	3,187	695	754	339	0	4,110
2911	*Petroleum Refining*[d]	5,019	31,910	15,731	752	668	430	336	0	4,073
30	Rubber and Misc. Plastics Products	213	25,784	1,729	737	94	29	328	0	3
31	Leather and Leather Products	13	1,053	378	201	4	2	32	0	*
32	Stone, Clay and Glass Products	895	30,755	1,496	6,924	374	48	14,635	267	20
3241	*Cement, Hydraulic*	317	9,886	202	658	16	1	11,571	W	W
33	Primary Metal Industries	2,626	140,476	6,405	2,304	672	68	41,676	9,286	33
3312	*Blast Furnaces and Steel Mills*	1,869	38,995	5,458	988	400	5	39,888	7,243	14
3334	*Primary Aluminum*	248	61,648	W	52	22	8	19	W	8
34	Fabricated Metal Products	302	26,804	801	1,742	172	48	329	44	6
35	Machinery, Except Electrical	240	28,623	1,150	1,326	102	36	741	24	3
36	Electric and Electronic Equipment	211	30,884	984	578	80	16	373	22	3
37	Transportation Equipment	321	32,767	2,630	1,629	124	30	1,860	37	11
38	Instruments and Related Products	73	7,570	W	196	20	Q	W	0	1
39	Misc. Manufacturing Industries	31	3,190	312	168	14	4	48	0	Q
	Total	17,522	636,937	87,008	35,739	5,012	9,399	97,981	10,336	5,982
					Northeast Census Region					
20	Food and Kindred Products	104	5,939	2,093	1,223	49	7	108	0	10
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	30	1,882	1,347	336	10	7	25	0	1
23	Apparel and Other Textile Products	7	751	112	245	2	Q	0	0	*
24	Lumber and Wood Products	16	925	Q	Q	2	Q	0	0	Q
25	Furniture and Fixtures	8	495	48	132	3	Q	Q	0	Q
26	Paper and Allied Products	286	8,622	10,584	556	49	26	1,160	0	109
2621	*Paper Mills, Except Building Paper*	220	5,968	8,427	176	W	17	W	0	98
2631	*Paperboard Mills*	16	493	957	Q	7	1	35	0	*
27	Printing and Publishing	15	2,078	Q	173	4	Q	Q	0	1
28	Chemicals and Allied Products	205	11,166	5,868	1,333	47	Q	1,022	0	15
2819	*Industrial Inorganic Chemicals*	10	487	490	123	4	1	10	0	*
2821	*Plastics Materials and Resins*	31	1,307	639	W	W	W	W	0	W
2869	*Industrial Organic Chemicals*	Q	1,791	596	547	5	Q	0	0	11
2873	*Nitrogenous Fertilizers*	W	W	W	*	*	*	0	0	*
29	Petroleum and Coal Products	423	2,386	4,661	1,314	21	W	W	0	351
2911	*Petroleum Refining*[d]	404	1,760	W	W	W	W	W	0	350
30	Rubber and Misc. Plastics Products	37	5,055	796	312	11	12	0	0	1
31	Leather and Leather Products	5	317	303	92	1	1	29	0	Q
32	Stone, Clay and Glass Products	138	5,318	413	915	69	W	1,642	W	3
3241	*Cement, Hydraulic*	38	1,249	Q	103	Q	*	1,342	0	2
33	Primary Metal Industries	517	20,560	W	W	117	18	11,057	428	7
3312	*Blast Furnaces and Steel Mills*	417	9,135	1,101	219	83	3	10,606	182	5
3334	*Primary Aluminum*	W	W	W	W	W	*	W	0	W
34	Fabricated Metal Products	66	5,418	543	1,023	33	11	30	21	1
35	Machinery, Except Electrical	51	5,837	1,065	678	17	8	79	Q	1
36	Electric and Electronic Equipment	53	7,743	823	387	17	5	W	W	W
37	Transportation Equipment	44	3,900	1,281	518	11	W	W	0	2
38	Instruments and Related Products	38	2,417	1,025	W	6	*	W	0	*
39	Misc. Manufacturing Industries	13	1,320	290	134	4	1	W	0	Q
	Total	2,056	92,157	32,993	10,980	472	Q	16,449	475	512

See footnotes at end of table.

Table 1. Total Primary Consumption of Energy for All Purposes by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 1. (Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke and Breeze (1000 short tons)	Other[c] (trillion Btu)
					Midwest Census Region					
20	Food and Kindred Products	371	16,727	913	790	197	Q	3,934	71	8
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	4	455	42	22	2	Q	12	0	*
24	Lumber and Wood Products	25	1,548	W	323	6	W	W	0	9
25	Furniture and Fixtures	16	1,092	10	Q	9	1	W	0	1
26	Paper and Allied Products	322	10,658	696	334	87	11	4,976	0	78
2621	*Paper Mills, Except Building Paper*	174	5,108	462	108	33	2	2,974	0	53
2631	*Paperboard Mills*	67	1,914	109	20	14	1	1,177	0	19
27	Printing and Publishing	32	3,836	W	Q	W	2	12	0	1
28	Chemicals and Allied Products	544	32,650	620	Q	211	993	3,482	0	43
2819	*Industrial Inorganic Chemicals*	79	16,321	168	24	14	*	204	0	3
2821	*Plastics Materials and Resins*	116	2,649	116	18	24	W	W	0	1
2869	*Industrial Organic Chemicals*	70	1,693	W	W	28	W	1,243	0	7
2873	*Nitrogenous Fertilizers*	95	1,291	0	6	88	*	0	0	*
29	Petroleum and Coal Products	703	5,600	7,055	489	W	W	55	0	578
2911	*Petroleum Refining*[d]	683	5,215	W	W	42	52	W	0	574
30	Rubber and Misc. Plastics Products	80	9,240	143	69	39	7	207	0	1
31	Leather and Leather Products	4	408	W	Q	2	*	2	0	*
32	Stone, Clay and Glass Products	265	8,615	122	1,400	105	6	4,971	74	6
3241	*Cement, Hydraulic*	93	2,598	28	212	5	*	3,369	W	W
33	Primary Metal Industries	1,280	45,920	1,960	751	345	34	20,518	6,653	11
3312	*Blast Furnaces and Steel Mills*	1,005	17,552	W	W	226	1	W	5,482	W
3334	*Primary Aluminum*	W	W	0	W	W	6	W	W	2
34	Fabricated Metal Products	136	11,345	243	W	82	17	264	W	2
35	Machinery, Except Electrical	121	11,522	52	371	60	16	633	22	1
36	Electric and Electronic Equipment	62	6,616	90	46	31	5	270	W	W
37	Transportation Equipment	181	16,338	629	703	75	11	1,544	32	4
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	8	657	Q	12	5	*	W	0	W
	Total	4,171	185,413	12,736	6,846	1,333	1,212	40,994	6,867	747
					South Census Region					
20	Food and Kindred Products	278	15,230	1,395	1,710	125	17	517	6	64
21	Tobacco Manufactures	18	1,185	265	55	3	1	407	0	*
22	Textile Mill Products	210	23,071	1,512	589	73	17	1,586	0	7
23	Apparel and Other Textile Products	18	2,637	Q	105	6	2	59	0	*
24	Lumber and Wood Products	153	6,210	132	1,555	9	11	0	0	112
25	Furniture and Fixtures	22	2,339	86	128	5	5	59	0	5
26	Paper and Allied Products	1,289	21,096	10,205	994	198	12	7,389	0	779
2621	*Paper Mills, Except Building Paper*	475	11,307	2,596	714	72	3	3,916	0	254
2631	*Paperboard Mills*	570	4,826	4,583	148	87	2	3,225	0	362
27	Printing and Publishing	21	3,797	71	31	7	3	0	0	1
28	Chemicals and Allied Products	2,639	65,389	9,820	1,918	1,257	7,021	9,690	255	220
2819	*Industrial Inorganic Chemicals*	174	11,941	422	255	95	2	1,030	255	Q
2821	*Plastics Materials and Resins*	424	7,851	108	64	133	2,370	549	0	43
2869	*Industrial Organic Chemicals*	983	13,108	2,801	204	476	3,395	3,005	0	69
2873	*Nitrogenous Fertilizers*	W	W	W	20	285	W	0	0	*
29	Petroleum and Coal Products	3,116	17,273	3,055	632	528	W	W	0	2,476
2911	*Petroleum Refining*[d]	3,073	16,879	W	127	517	W	W	0	2,458
30	Rubber and Misc. Plastics Products	80	9,130	715	313	38	7	121	0	1
31	Leather and Leather Products	3	253	W	Q	1	Q	Q	0	*
32	Stone, Clay and Glass Products	352	12,043	215	3,488	152	W	5,270	Q	10
3241	*Cement, Hydraulic*	114	3,818	52	202	7	*	4,197	W	W
33	Primary Metal Industries	597	41,683	2,257	531	149	9	8,412	2,104	7
3312	*Blast Furnaces and Steel Mills*	383	10,344	2,235	215	76	1	8,031	1,578	1
3334	*Primary Aluminum*	85	20,485	0	20	11	1	13	W	W
34	Fabricated Metal Products	69	6,919	15	W	39	16	34	W	1
35	Machinery, Except Electrical	47	7,304	33	254	18	8	28	*	1
36	Electric and Electronic Equipment	63	9,724	72	128	24	6	W	W	1
37	Transportation Equipment	57	6,983	W	244	22	W	W	W	3
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	7	894	Q	19	3	Q	0	0	*
	Total	9,048	254,940	30,508	13,040	2,660	7,335	33,793	2,551	3,687

See footnotes at end of table.

Table 1. Total Primary Consumption of Energy for All Purposes by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 1. (Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke and Breeze (1000 short tons)	Other[c] (trillion Btu)
		West Census Region								
20	Food and Kindred Products	197	6,521	1,888	639	93	23	1,013	45	38
21	Tobacco Manufactures	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	3	197	0	4	3	*	0	0	Q
23	Apparel and Other Textile Products	1	188	0	0	1	Q	0	0	0
24	Lumber and Wood Products	131	5,071	131	1,321	7	14	0	0	97
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	314	11,571	3,243	165	60	7	490	0	180
2621	*Paper Mills, Except Building Paper*	128	6,630	1,082	56	W	2	W	0	64
2631	*Paperboard Mills*	117	2,238	1,181	58	21	1	189	0	76
27	Printing and Publishing	9	1,471	0	Q	W	1	0	0	*
28	Chemicals and Allied Products	180	10,244	191	161	113	3	763	278	2
2819	*Industrial Inorganic Chemicals*	50	4,109	168	139	9	*	763	278	1
2821	*Plastics Materials and Resins*	1	99	0	W	W	*	0	0	W
2869	*Industrial Organic Chemicals*	3	-67	W	W	3	*	0	0	*
2873	*Nitrogenous Fertilizers*	81	857	0	1	76	*	0	0	*
29	Petroleum and Coal Products	882	7,995	3,816	752	W	W	0	0	707
2911	*Petroleum Refining*[d]	859	8,055	W	W	W	215	0	0	691
30	Rubber and Misc. Plastics Products	16	2,358	75	43	6	Q	0	0	*
31	Leather and Leather Products	1	75	0	0	1	*	0	0	*
32	Stone, Clay and Glass Products	140	4,779	747	1,122	48	5	2,751	Q	1
3241	*Cement, Hydraulic*	72	2,222	37	142	4	*	2,664	0	1
33	Primary Metal Industries	232	32,312	W	W	60	6	1,689	101	7
3312	*Blast Furnaces and Steel Mills*	64	1,964	W	W	15	*	W	0	W
3334	*Primary Aluminum*	90	23,264	W	16	6	1	W	W	3
34	Fabricated Metal Products	31	3,122	0	109	18	4	0	0	1
35	Machinery, Except Electrical	22	3,960	0	22	7	Q	0	0	Q
36	Electric and Electronic Equipment	33	6,802	0	Q	9	Q	0	0	1
37	Transportation Equipment	40	5,547	W	163	16	3	0	W	2
38	Instruments and Related Products	10	1,601	Q	Q	5	Q	0	0	*
39	Misc. Manufacturing Industries	3	317	0	Q	2	Q	0	0	0
	Total	2,247	104,426	10,773	4,875	548	294	6,705	444	1,037

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

[b] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

[c] "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power or as feedstock/raw material inputs. See also footnote "d."

[d] For the petroleum refining industry only, the feedstocks and raw material inputs for the production of nonenergy products (i.e., asphalt, waxes, lubricants, and solvents) are included in the "other" column, regardless of type of energy. The remaining columns for the petroleum refining industry include only energy that was consumed for the production of heat and power. The "other" column also includes net steam and other energy that respondents indicated was used in the production of heat and power. Those inputs and feedstocks that were converted to other energy products (e.g., crude oil converted to residual and distillate fuel oils) are excluded. See Appendix A for more information.

*Estimate less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table are for the primary consumption of energy for heat and power and as feedstocks or raw material inputs. Primary consumption is defined as the consumption of the energy that was originally produced offsite or was produced onsite from input materials not classified as an energy. Examples of the latter are hydrogen produced from the electrolysis of brine; the output of captive (onsite) mines or wells; woodchips, bark, and woodwaste from wood purchased as a raw material input; and waste materials such as wastepaper and packing materials. Primary consumption excludes quantities of energy that are produced from other energy inputs and therefore avoids double-counting.

Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Office of Oil and Gas, Petroleum Supply Division, Form EIA-810, "Monthly Refinery Report" for 1985.

Table 1. Total Primary Consumption of Energy for All Purposes by Census Region, Industry Group, and Selected Industries, 1985

Part 2. (Estimates in Trillion Btu)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity[b]	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke and Breeze	Other[c]
					Total United States					
20	Food and Kindred Products	949	152	40	25	479	8	123	3	121
21	Tobacco Manufactures	19	4	2	*	3	*	9	0	*
22	Textile Mill Products	248	87	18	5	92	2	36	0	8
23	Apparel and Other Textile Products	31	14	1	2	11	*	2	0	*
24	Lumber and Wood Products	325	47	W	23	24	W	W	0	224
25	Furniture and Fixtures	48	14	1	2	19	1	2	0	9
26	Paper and Allied Products	2,211	177	155	12	406	5	309	0	1,146
2621	*Paper Mills, Except Building Paper*	997	99	79	6	158	2	183	0	469
2631	*Paperboard Mills*	770	32	43	1	133	*	102	0	458
27	Printing and Publishing	76	38	1	1	32	1	1	0	3
28	Chemicals and Allied Products	3,567	408	104	26	1,680	725	332	13	280
2819	*Industrial Inorganic Chemicals*	312	112	8	3	126	*	45	13	5
2821	*Plastics Materials and Resins*	573	41	5	2	171	279	28	0	46
2869	*Industrial Organic Chemicals*	1,115	56	22	5	528	322	94	0	87
2873	*Nitrogenous Fertilizers*	479	13	W	*	463	W	0	0	W
29	Petroleum and Coal Products	5,123	113	117	19	717	39	8	0	4,110
2911	*Petroleum Refining*[d]	5,019	109	99	4	689	37	8	0	4,073
30	Rubber and Misc. Plastics Products	213	88	11	4	97	3	7	0	3
31	Leather and Leather Products	13	4	2	1	5	*	1	0	*
32	Stone, Clay and Glass Products	895	105	9	40	386	4	323	7	20
3241	*Cement, Hydraulic*	317	34	1	4	16	*	255	W	W
33	Primary Metal Industries	2,626	479	40	13	693	6	1,131	230	33
3312	*Blast Furnaces and Steel Mills*	1,869	133	34	6	412	*	1,090	180	14
3334	*Primary Aluminum*	248	210	W	*	23	1	*	W	8
34	Fabricated Metal Products	302	91	5	10	178	4	7	1	6
35	Machinery, Except Electrical	240	98	7	8	105	3	16	1	3
36	Electric and Electronic Equipment	211	105	6	3	83	1	8	1	3
37	Transportation Equipment	321	112	17	9	128	3	41	1	11
38	Instruments and Related Products	73	26	W	1	21	Q	W	0	1
39	Misc. Manufacturing Industries	31	11	2	1	14	*	1	0	Q
	Total	17,522	2,173	547	208	5,172	808	2,375	256	5,982
					Northeast Census Region					
20	Food and Kindred Products	104	20	13	7	50	1	2	0	10
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	30	6	8	2	10	1	1	0	1
23	Apparel and Other Textile Products	7	3	1	1	2	Q	0	0	*
24	Lumber and Wood Products	16	3	Q	Q	2	Q	0	0	Q
25	Furniture and Fixtures	8	2	*	1	3	Q	Q	0	Q
26	Paper and Allied Products	286	29	67	3	50	2	26	0	109
2621	*Paper Mills, Except Building Paper*	220	20	53	1	W	1	W	0	98
2631	*Paperboard Mills*	16	2	6	Q	7	*	1	0	*
27	Printing and Publishing	15	7	Q	1	5	Q	Q	0	1
28	Chemicals and Allied Products	205	38	37	8	48	Q	23	0	15
2819	*Industrial Inorganic Chemicals*	10	2	3	1	4	*	*	0	*
2821	*Plastics Materials and Resins*	31	4	4	W	W	W	6	0	W
2869	*Industrial Organic Chemicals*	Q	6	4	3	5	Q	0	0	11
2873	*Nitrogenous Fertilizers*	W	W	W	*	*	*	0	0	*
29	Petroleum and Coal Products	423	8	29	8	22	W	W	0	351
2911	*Petroleum Refining*[d]	404	6	W	W	W	W	W	0	350
30	Rubber and Misc. Plastics Products	37	17	5	2	11	1	0	0	1
31	Leather and Leather Products	5	1	2	1	1	*	1	0	Q
32	Stone, Clay and Glass Products	138	18	3	5	71	W	36	W	3
3241	*Cement, Hydraulic*	38	4	Q	1	Q	*	30	0	2
33	Primary Metal Industries	517	70	W	W	121	2	293	11	7
3312	*Blast Furnaces and Steel Mills*	417	31	7	1	85	*	283	5	5
3334	*Primary Aluminum*	W	W	W	W	W	*	W	0	W
34	Fabricated Metal Products	66	18	3	6	34	1	1	1	1
35	Machinery, Except Electrical	51	20	7	4	17	1	2	Q	1
36	Electric and Electronic Equipment	53	26	5	2	17	*	W	W	W
37	Transportation Equipment	44	13	8	3	12	W	W	0	2
38	Instruments and Related Products	38	8	6	W	6	*	W	0	*
39	Misc. Manufacturing Industries	13	5	2	1	4	*	W	0	Q
	Total	2,056	314	207	64	487	Q	414	12	512

See footnotes at end of table.

Table 1. Total Primary Consumption of Energy for All Purposes by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 2. (Estimates in Trillion Btu)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity[b]	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke and Breeze	Other[c]
					Midwest Census Region					
20	Food and Kindred Products	371	57	6	5	203	Q	87	2	8
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	4	2	*	*	2	Q	*	0	*
24	Lumber and Wood Products	25	5	W	2	6	W	W	0	9
25	Furniture and Fixtures	16	4	*	Q	10	*	W	0	1
26	Paper and Allied Products	322	36	4	2	90	1	110	0	78
2621	*Paper Mills, Except Building Paper*	174	17	3	1	35	*	66	0	53
2631	*Paperboard Mills*	67	7	1	*	14	*	26	0	19
27	Printing and Publishing	32	13	W	Q	W	*	*	0	1
28	Chemicals and Allied Products	544	111	4	Q	218	85	77	0	43
2819	*Industrial Inorganic Chemicals*	79	56	1	*	15	*	5	0	3
2821	*Plastics Materials and Resins*	116	9	1	*	25	W	W	0	1
2869	*Industrial Organic Chemicals*	70	6	W	W	28	W	27	0	7
2873	*Nitrogenous Fertilizers*	95	4	0	*	91	*	0	0	*
29	Petroleum and Coal Products	703	19	44	3	W	W	1	0	578
2911	*Petroleum Refining*[d]	683	18	W	W	43	4	W	0	574
30	Rubber and Misc. Plastics Products	80	32	1	*	40	1	5	0	1
31	Leather and Leather Products	4	1	W	Q	2	*	*	0	*
32	Stone, Clay and Glass Products	265	29	1	8	109	1	110	2	6
3241	*Cement, Hydraulic*	93	9	*	1	5	*	74	W	W
33	Primary Metal Industries	1,280	157	12	4	357	3	570	165	11
3312	*Blast Furnaces and Steel Mills*	1,005	60	W	W	233	*	W	136	W
3334	*Primary Aluminum*	W	W	0	W	W	1	W	W	2
34	Fabricated Metal Products	136	39	2	W	84	1	6	W	2
35	Machinery, Except Electrical	121	39	*	2	62	1	14	1	1
36	Electric and Electronic Equipment	62	23	1	*	32	*	6	W	W
37	Transportation Equipment	181	56	4	4	77	1	34	1	4
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	8	2	Q	*	5	*	W	0	W
	Total	4,171	633	80	40	1,375	104	1,022	170	747
					South Census Region					
20	Food and Kindred Products	278	52	9	10	129	1	11	*	64
21	Tobacco Manufactures	18	4	2	*	3	*	9	0	*
22	Textile Mill Products	210	79	10	3	75	1	35	0	7
23	Apparel and Other Textile Products	18	9	Q	1	6	*	1	0	*
24	Lumber and Wood Products	153	21	1	9	9	1	0	0	112
25	Furniture and Fixtures	22	8	1	1	5	*	1	0	5
26	Paper and Allied Products	1,289	72	64	6	205	1	163	0	779
2621	*Paper Mills, Except Building Paper*	475	39	16	4	75	*	86	0	254
2631	*Paperboard Mills*	570	16	29	1	90	*	71	0	362
27	Printing and Publishing	21	13	*	*	7	*	0	0	1
28	Chemicals and Allied Products	2,639	223	62	11	1,297	604	216	6	220
2819	*Industrial Inorganic Chemicals*	174	41	3	1	98	*	23	6	Q
2821	*Plastics Materials and Resins*	424	27	1	*	138	204	12	0	43
2869	*Industrial Organic Chemicals*	983	45	18	1	491	292	67	0	69
2873	*Nitrogenous Fertilizers*	W	W	W	*	294	W	0	0	*
29	Petroleum and Coal Products	3,116	59	19	4	545	W	W	0	2,476
2911	*Petroleum Refining*[d]	3,073	58	W	1	534	W	W	0	2,458
30	Rubber and Misc. Plastics Products	80	31	4	2	39	1	3	0	1
31	Leather and Leather Products	3	1	W	Q	1	Q	Q	0	*
32	Stone, Clay and Glass Products	352	41	1	20	157	W	116	Q	10
3241	*Cement, Hydraulic*	114	13	*	1	7	*	92	W	W
33	Primary Metal Industries	597	142	14	3	154	1	223	52	7
3312	*Blast Furnaces and Steel Mills*	383	35	14	1	78	*	214	39	1
3334	*Primary Aluminum*	85	70	0	*	11	*	*	W	W
34	Fabricated Metal Products	69	24	*	W	40	1	1	W	1
35	Machinery, Except Electrical	47	25	*	1	18	1	1	*	1
36	Electric and Electronic Equipment	63	33	*	1	25	*	W	W	1
37	Transportation Equipment	57	24	W	1	22	W	W	W	3
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	7	3	Q	*	3	Q	0	0	*
	Total	9,048	870	192	76	2,745	631	786	63	3,687

See footnotes at end of table.

Table 1. Total Primary Consumption of Energy for All Purposes by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 2. (Estimates in Trillion Btu)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity[b]	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke and Breeze	Other[c]
		West Census Region								
20	Food and Kindred Products	197	22	12	4	96	2	22	1	38
21	Tobacco Manufactures	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	3	1	0	*	3	*	0	0	Q
23	Apparel and Other Textile Products	1	1	0	0	1	Q	0	0	0
24	Lumber and Wood Products	131	17	1	8	7	1	0	0	97
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	314	39	20	1	62	1	11	0	180
2621	*Paper Mills, Except Building Paper*	128	23	7	*	W	*	W	0	64
2631	*Paperboard Mills*	117	8	7	*	21	*	4	0	76
27	Printing and Publishing	9	5	0	Q	W	*	0	0	*
28	Chemicals and Allied Products	180	35	1	1	117	*	17	7	2
2819	*Industrial Inorganic Chemicals*	50	14	1	1	9	*	17	7	1
2821	*Plastics Materials and Resins*	1	*	0	W	W	*	0	0	W
2869	*Industrial Organic Chemicals*	3	*	W	W	3	*	0	0	*
2873	*Nitrogenous Fertilizers*	81	3	0	*	78	*	0	0	*
29	Petroleum and Coal Products	882	27	24	4	W	W	0	0	707
2911	*Petroleum Refining*[d]	859	27	W	W	W	18	0	0	691
30	Rubber and Misc. Plastics Products	16	8	*	*	7	Q	0	0	*
31	Leather and Leather Products	1	*	0	0	1	*	0	0	*
32	Stone, Clay and Glass Products	140	16	5	7	49	*	61	Q	1
3241	*Cement, Hydraulic*	72	8	*	1	4	*	59	0	1
33	Primary Metal Industries	232	110	W	W	62	*	44	2	7
3312	*Blast Furnaces and Steel Mills*	64	7	W	W	16	*	W	0	W
3334	*Primary Aluminum*	90	79	W	*	6	*	W	W	3
34	Fabricated Metal Products	31	11	0	1	19	*	0	0	1
35	Machinery, Except Electrical	22	14	0	*	8	Q	0	0	Q
36	Electric and Electronic Equipment	33	23	0	Q	9	Q	0	0	1
37	Transportation Equipment	40	19	W	1	17	*	0	W	2
38	Instruments and Related Products	10	5	Q	Q	5	Q	0	0	*
39	Misc. Manufacturing Industries	3	1	0	Q	2	Q	0	0	0
	Total	2,247	356	68	28	566	25	154	11	1,037

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

[b] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

[c] "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power or as feedstock/raw material inputs. See also footnote "d."

[d] For the petroleum refining industry only, the feedstocks and raw material inputs for the production of nonenergy products (i.e., asphalt, waxes, lubricants, and solvents) are included in the "other" column, regardless of type of energy. The remaining columns for the petroleum refining industry include only energy that was consumed for the production of heat and power. The "other" column also includes net steam and other energy that respondents indicated was used in the production of heat and power. Those inputs and feedstocks that were converted to other energy products (e.g., crude oil converted to residual and distillate fuel oils) are excluded. See Appendix A for more information.

*Estimate less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table are for the primary consumption of energy for heat and power and as feedstocks or raw material inputs. Primary consumption is defined as the consumption of the energy that was originally produced offsite or was produced onsite from input materials not classified as energy. Examples of the latter are hydrogen produced from the electrolysis of brine; the output of captive (onsite) mines or wells; woodchips, bark, and woodwaste from wood purchased as a raw material input; and waste materials such as wastepaper and packing materials. Primary consumption excludes quantities of energy that are produced from other energy inputs and therefore avoids double-counting.

Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Office of Oil and Gas, Petroleum Supply Division, Form EIA-810, "Monthly Refinery Report" for 1985.

Table 2. Total Primary Consumption of Energy for All Purposes by Economic Characteristics of the Establishment, 1985

(Estimates in Btu or Physical Units)

Establishment Characteristics[a]	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[c] (trillion Btu)
Value of Shipments and Receipts (million dollars)									
Under 20	1,698	119,784	9,694	19,686	671	Q	6,247	802	211
20-49	1,658	102,789	15,120	5,555	656	Q	11,066	679	209
50-99	1,611	82,613	11,987	2,522	608	450	12,139	713	269
100-249	3,056	138,260	16,428	2,611	1,053	1,469	17,986	803	823
250-499	2,241	88,541	10,838	1,994	775	2,866	14,952	1,700	417
500 and Over	4,811	104,949	22,940	3,373	1,248	3,722	35,589	5,639	1,602
Not ascertained[d]	2,449	0	0	0	0	0	0	0	2,449
Total	17,522	636,937	87,008	35,739	5,012	9,399	97,981	10,336	5,982
Employment Size									
Under 50	696	45,052	2,943	11,010	271	Q	1,288	Q	90
50-99	761	40,873	5,551	5,595	367	202	2,622	113	98
100-249	2,237	106,640	17,543	6,603	845	789	14,992	732	429
250-499	2,679	109,834	13,364	3,779	1,022	1,936	12,031	826	676
500-999	3,184	138,467	16,372	2,879	982	2,501	11,098	740	1,099
1,000 and over	5,515	196,070	31,236	5,874	1,526	3,344	55,950	7,701	1,139
Not ascertained[d]	2,449	0	0	0	0	0	0	0	2,449
Total	17,522	636,937	87,008	35,739	5,012	9,399	97,981	10,336	5,982

[a] Value of Shipments and Receipts and Employment Size were supplied by the Bureau of the Census.

[b] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

[c] "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power or as feedstock/raw material inputs. See also footnote "d."

[d] The entry in the "Not ascertained" row and the "Other" column consists of the feedstocks and raw material inputs that were consumed by petroleum refineries for the production of nonenergy products (i.e., asphalt, waxes, lubricants, and solvents). That entry includes all of those inputs, regardless of type. Those inputs that were converted to other energy products by petroleum refineries (e.g., crude oil converted to residual and distillate fuel oils) are excluded. The quantities of energy consumed by petroleum refineries for the production of heat and power are included in the appropriate "Value of Shipments and Receipts" or "Employment Size" rows. See Appendix A for more information.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table are for the primary consumption of energy for heat and power and as feedstocks or raw material inputs. Primary consumption is defined as the consumption of energy that was originally produced offsite or was produced onsite from input materials not classified as energy. Examples of the latter are hydrogen produced from the electrolysis of brine; the output of captive (onsite) mines or wells; woodchips, bark, and woodwaste from wood purchased as a raw material input; and waste materials such as wastepaper and packing materials. Primary consumption excludes quantities of energy that are produced from other energy inputs and therefore avoids double-counting.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey" and Office of Oil and Gas, Petroleum Supply Division, Form EIA-810, "Monthly Refinery Report," for 1985.

Table 3. Total Inputs of Energy for Heat, Power, and Electricity Generation by Census Region, Industry Group, and Selected Industries, 1985

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)
			Total United States			
20	Food and Kindred Products	946	44,417	6,290	4,215	462
21	Tobacco Manufactures	19	1,225	308	55	3
22	Textile Mill Products	248	25,552	2,858	922	89
23	Apparel and Other Textile Products	30	4,030	165	373	11
24	Lumber and Wood Products	333	13,753	W	3,911	24
25	Furniture and Fixtures	48	4,220	145	342	18
26	Paper and Allied Products	2,198	51,948	W	1,963	387
2621	*Paper Mills, Except Building Paper*	996	29,012	12,567	1,030	152
2631	*Paperboard Mills*	758	9,471	6,697	197	124
27	Printing and Publishing	76	11,184	W	256	31
28	Chemicals and Allied Products	2,407	119,448	11,477	2,741	1,153
2819	*Industrial Inorganic Chemicals*	295	32,857	1,220	515	118
2821	*Plastics Materials and Resins*	277	11,907	1,059	384	W
2869	*Industrial Organic Chemicals*	797	16,524	W	755	389
2873	*Nitrogenous Fertilizers*	213	3,956	W	25	190
29	Petroleum and Coal Products	2,631	33,254	17,079	2,807	694
2911	*Petroleum Refining*	2,570	31,910	15,731	752	668
30	Rubber and Misc. Plastics Products	212	25,784	1,729	W	94
31	Leather and Leather Products	13	1,053	378	199	4
32	Stone, Clay and Glass Products	896	30,755	1,491	5,643	372
3241	*Cement, Hydraulic*	328	9,886	W	643	16
33	Primary Metal Industries	2,391	140,476	6,405	2,098	666
3312	*Blast Furnaces and Steel Mills*	1,677	38,995	5,458	942	400
3334	*Primary Aluminum*	234	61,648	W	52	W
34	Fabricated Metal Products	298	26,804	801	1,721	169
35	Machinery, Except Electrical	239	28,623	1,152	1,298	101
36	Electric and Electronic Equipment	209	30,884	984	W	80
37	Transportation Equipment	317	32,767	2,630	1,501	121
38	Instruments and Related Products	73	7,570	W	W	20
39	Misc. Manufacturing Industries	31	3,190	312	164	14
	Total	13,615	636,937	80,252	31,684	4,512
			Northeast Census Region			
20	Food and Kindred Products	104	5,939	2,093	1,207	49
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	30	1,882	1,347	336	10
23	Apparel and Other Textile Products	7	751	112	245	2
24	Lumber and Wood Products	16	925	Q	Q	2
25	Furniture and Fixtures	8	495	48	132	3
26	Paper and Allied Products	W	8,622	10,574	529	48
2621	*Paper Mills, Except Building Paper*	W	5,968	8,427	163	W
2631	*Paperboard Mills*	16	493	957	Q	W
27	Printing and Publishing	W	2,078	Q	173	W
28	Chemicals and Allied Products	168	11,166	5,868	1,343	45
2819	*Industrial Inorganic Chemicals*	10	487	490	123	4
2821	*Plastics Materials and Resins*	W	1,307	639	227	7
2869	*Industrial Organic Chemicals*	29	1,791	596	W	W
2873	*Nitrogenous Fertilizers*	W	W	W	*	*
29	Petroleum and Coal Products	182	2,386	W	W	20
2911	*Petroleum Refining*	164	1,760	W	W	W
30	Rubber and Misc. Plastics Products	37	5,055	796	312	11
31	Leather and Leather Products	5	317	303	92	W
32	Stone, Clay and Glass Products	139	5,318	412	891	69
3241	*Cement, Hydraulic*	39	1,249	Q	93	Q
33	Primary Metal Industries	427	20,560	W	610	117
3312	*Blast Furnaces and Steel Mills*	W	9,135	W	216	83
3334	*Primary Aluminum*	W	W	W	W	W
34	Fabricated Metal Products	65	5,418	543	1,008	33
35	Machinery, Except Electrical	51	5,837	1,067	670	17
36	Electric and Electronic Equipment	W	7,743	823	W	17
37	Transportation Equipment	43	3,900	1,281	W	W
38	Instruments and Related Products	38	2,417	1,025	149	6
39	Misc. Manufacturing Industries	13	1,320	W	W	4
	Total	1,683	92,157	32,910	10,634	467

See footnotes at end of table.

Table 3. Total Inputs of Energy for Heat, Power, and Electricity Generation by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Major Byproducts[c] (trillion Btu)	Other[d] (trillion Btu)
			Total United States			
20	Food and Kindred Products	88	5,571	122	Q	120
21	Tobacco Manufactures	1	407	0	0	*
22	Textile Mill Products	24	1,631	0	0	8
23	Apparel and Other Textile Products	4	70	0	0	*
24	Lumber and Wood Products	W	W	0	*	233
25	Furniture and Fixtures	8	89	0	0	9
26	Paper and Allied Products	56	14,015	0	730	W
2621	*Paper Mills, Except Building Paper*	24	8,315	0	295	174
2631	*Paperboard Mills*	5	4,626	0	292	160
27	Printing and Publishing	11	36	0	0	W
28	Chemicals and Allied Products	W	14,313	W	44	344
2819	*Industrial Inorganic Chemicals*	4	1,882	0	0	8
2821	*Plastics Materials and Resins*	4	1,276	0	W	68
2869	*Industrial Organic Chemicals*	161	W	0	W	W
2873	*Nitrogenous Fertilizers*	*	0	0	0	W
29	Petroleum and Coal Products	454	339	0	1,165	462
2911	*Petroleum Refining*	430	336	0	1,165	459
30	Rubber and Misc. Plastics Products	25	W	0	0	3
31	Leather and Leather Products	2	32	0	0	*
32	Stone, Clay and Glass Products	44	14,551	143	*	37
3241	*Cement, Hydraulic*	1	11,571	W	*	W
33	Primary Metal Industries	58	3,635	23,315	475	33
3312	*Blast Furnaces and Steel Mills*	5	2,183	21,856	475	26
3334	*Primary Aluminum*	W	0	0	0	W
34	Fabricated Metal Products	46	329	32	0	5
35	Machinery, Except Electrical	35	741	24	0	2
36	Electric and Electronic Equipment	15	W	4	0	2
37	Transportation Equipment	28	1,860	32	0	11
38	Instruments and Related Products	Q	W	0	0	1
39	Misc. Manufacturing Industries	3	48	0	0	Q
	Total	1,116	59,195	23,808	2,415	1,687
			Northeast Census Region			
20	Food and Kindred Products	7	108	0	0	10
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	7	25	0	0	1
23	Apparel and Other Textile Products	Q	0	0	0	*
24	Lumber and Wood Products	Q	0	0	0	Q
25	Furniture and Fixtures	Q	Q	0	0	Q
26	Paper and Allied Products	W	1,160	0	56	W
2621	*Paper Mills, Except Building Paper*	17	W	0	W	47
2631	*Paperboard Mills*	1	W	0	0	*
27	Printing and Publishing	Q	Q	0	0	W
28	Chemicals and Allied Products	3	1,022	0	0	15
2819	*Industrial Inorganic Chemicals*	1	10	0	0	*
2821	*Plastics Materials and Resins*	*	W	0	0	3
2869	*Industrial Organic Chemicals*	Q	0	0	0	11
2873	*Nitrogenous Fertilizers*	*	0	0	0	W
29	Petroleum and Coal Products	W	W	0	73	37
2911	*Petroleum Refining*	W	W	0	73	37
30	Rubber and Misc. Plastics Products	12	0	0	0	1
31	Leather and Leather Products	1	29	0	0	*
32	Stone, Clay and Glass Products	W	W	W	*	W
3241	*Cement, Hydraulic*	*	1,342	0	*	3
33	Primary Metal Industries	15	W	W	W	10
3312	*Blast Furnaces and Steel Mills*	3	W	W	W	W
3334	*Primary Aluminum*	*	0	0	0	W
34	Fabricated Metal Products	10	W	W	0	1
35	Machinery, Except Electrical	8	79	Q	0	1
36	Electric and Electronic Equipment	4	W	W	0	W
37	Transportation Equipment	10	W	0	0	2
38	Instruments and Related Products	*	W	0	0	W
39	Misc. Manufacturing Industries	1	W	0	0	Q
	Total	W	W	W	222	147

Table 3. Total Inputs of Energy for Heat, Power, and Electricity Generation by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)
			Midwest Census Region			
20	Food and Kindred Products	369	16,727	913	690	196
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	4	455	42	22	2
24	Lumber and Wood Products	27	1,548	W	W	6
25	Furniture and Fixtures	16	1,092	W	Q	W
26	Paper and Allied Products	W	10,658	W	W	87
2621	*Paper Mills, Except Building Paper*	174	5,108	462	W	33
2631	*Paperboard Mills*	64	1,914	109	16	14
27	Printing and Publishing	W	3,836	W	Q	W
28	Chemicals and Allied Products	390	32,650	624	225	152
2819	*Industrial Inorganic Chemicals*	78	16,321	168	24	14
2821	*Plastics Materials and Resins*	W	2,649	116	W	W
2869	*Industrial Organic Chemicals*	56	1,693	47	52	W
2873	*Nitrogenous Fertilizers*	54	1,291	0	W	W
29	Petroleum and Coal Products	347	5,600	W	441	W
2911	*Petroleum Refining*	331	5,215	W	W	42
30	Rubber and Misc. Plastics Products	79	9,240	143	W	39
31	Leather and Leather Products	4	408	W	Q	2
32	Stone, Clay and Glass Products	272	8,615	122	1,366	105
3241	*Cement, Hydraulic*	W	2,598	28	W	5
33	Primary Metal Industries	1,250	45,920	1,960	695	343
3312	*Blast Furnaces and Steel Mills*	989	17,552	W	509	225
3334	*Primary Aluminum*	46	W	0	W	W
34	Fabricated Metal Products	135	11,345	W	W	81
35	Machinery, Except Electrical	120	11,522	52	370	59
36	Electric and Electronic Equipment	62	6,616	90	W	31
37	Transportation Equipment	178	16,338	629	W	72
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	8	657	Q	W	5
	Total	3,631	185,413	12,696	5,792	1,265
			South Census Region			
20	Food and Kindred Products	276	15,230	1,395	1,680	124
21	Tobacco Manufactures	18	1,185	265	55	3
22	Textile Mill Products	209	23,071	1,512	582	72
23	Apparel and Other Textile Products	18	2,637	Q	106	6
24	Lumber and Wood Products	160	6,210	132	1,521	9
25	Furniture and Fixtures	22	2,339	86	128	5
26	Paper and Allied Products	1,278	21,096	W	W	194
2621	*Paper Mills, Except Building Paper*	W	11,307	2,596	W	W
2631	*Paperboard Mills*	557	4,826	4,550	121	83
27	Printing and Publishing	21	3,797	W	31	7
28	Chemicals and Allied Products	1,730	65,389	4,794	1,031	895
2819	*Industrial Inorganic Chemicals*	163	11,941	394	248	91
2821	*Plastics Materials and Resins*	196	7,851	304	W	W
2869	*Industrial Organic Chemicals*	708	13,108	W	W	366
2873	*Nitrogenous Fertilizers*	W	W	W	W	W
29	Petroleum and Coal Products	1,548	17,273	1,663	366	527
2911	*Petroleum Refining*	1,526	16,879	W	127	517
30	Rubber and Misc. Plastics Products	80	9,130	715	W	38
31	Leather and Leather Products	3	253	W	Q	W
32	Stone, Clay and Glass Products	344	12,043	211	2,283	151
3241	*Cement, Hydraulic*	W	3,818	W	W	W
33	Primary Metal Industries	486	41,683	2,257	490	147
3312	*Blast Furnaces and Steel Mills*	289	10,344	2,235	W	76
3334	*Primary Aluminum*	80	20,485	0	20	W
34	Fabricated Metal Products	67	6,919	W	W	37
35	Machinery, Except Electrical	46	7,304	33	236	18
36	Electric and Electronic Equipment	61	9,724	72	128	24
37	Transportation Equipment	56	6,983	W	W	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	6	894	Q	19	3
	Total	6,441	254,940	24,036	10,512	2,285

See footnotes at end of table.

Table 3. Total Inputs of Energy for Heat, Power, and Electricity Generation by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Major Byproducts[c] (trillion Btu)	Other[d] (trillion Btu)
			Midwest Census Region			
20	Food and Kindred Products	Q	3,934	71	0	Q
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	Q	12	0	0	*
24	Lumber and Wood Products	W	W	0	*	12
25	Furniture and Fixtures	1	W	0	0	1
26	Paper and Allied Products	11	4,976	0	34	W
2621	*Paper Mills, Except Building Paper*	2	2,974	0	28	25
2631	*Paperboard Mills*	1	1,177	0	2	15
27	Printing and Publishing	W	12	0	0	W
28	Chemicals and Allied Products	W	3,482	0	Q	W
2819	*Industrial Inorganic Chemicals*	*	204	0	0	2
2821	*Plastics Materials and Resins*	W	W	0	0	W
2869	*Industrial Organic Chemicals*	1	1,243	0	0	W
2873	*Nitrogenous Fertilizers*	W	0	0	0	W
29	Petroleum and Coal Products	W	55	0	195	27
2911	*Petroleum Refining*	52	W	0	195	W
30	Rubber and Misc. Plastics Products	W	W	0	0	1
31	Leather and Leather Products	*	2	0	0	*
32	Stone, Clay and Glass Products	5	4,887	73	0	16
3241	*Cement, Hydraulic*	*	3,369	W	0	W
33	Primary Metal Industries	29	2,255	14,992	284	15
3312	*Blast Furnaces and Steel Mills*	1	W	W	W	W
3334	*Primary Aluminum*	W	0	0	0	W
34	Fabricated Metal Products	W	264	W	0	2
35	Machinery, Except Electrical	16	633	22	0	1
36	Electric and Electronic Equipment	W	W	0	0	W
37	Transportation Equipment	10	1,544	28	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	*	W	0	0	*
	Total	213	22,630	15,197	518	167
			South Census Region			
20	Food and Kindred Products	16	517	6	Q	64
21	Tobacco Manufactures	1	407	0	0	*
22	Textile Mill Products	17	1,586	0	0	7
23	Apparel and Other Textile Products	2	59	0	0	*
24	Lumber and Wood Products	11	0	0	0	119
25	Furniture and Fixtures	5	59	0	0	6
26	Paper and Allied Products	W	7,389	0	521	251
2621	*Paper Mills, Except Building Paper*	3	W	0	176	78
2631	*Paperboard Mills*	2	3,225	0	238	117
27	Printing and Publishing	W	0	0	0	1
28	Chemicals and Allied Products	W	9,047	W	39	291
2819	*Industrial Inorganic Chemicals*	2	905	0	0	4
2821	*Plastics Materials and Resins*	W	W	0	W	W
2869	*Industrial Organic Chemicals*	158	W	0	W	W
2873	*Nitrogenous Fertilizers*	W	0	0	0	W
29	Petroleum and Coal Products	W	W	0	611	303
2911	*Petroleum Refining*	W	W	0	611	300
30	Rubber and Misc. Plastics Products	W	121	0	0	1
31	Leather and Leather Products	Q	Q	0	0	W
32	Stone, Clay and Glass Products	W	5,270	W	*	W
3241	*Cement, Hydraulic*	*	4,197	W	0	W
33	Primary Metal Industries	9	410	3,258	82	2
3312	*Blast Furnaces and Steel Mills*	1	W	W	82	W
3334	*Primary Aluminum*	W	0	0	0	*
34	Fabricated Metal Products	W	W	W	0	W
35	Machinery, Except Electrical	8	28	*	0	*
36	Electric and Electronic Equipment	W	W	Q	0	*
37	Transportation Equipment	6	W	W	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	Q	0	0	0	*
	Total	478	25,148	3,451	1,254	1,062

Table 3. Total Inputs of Energy for Heat, Power, and Electricity Generation by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)
		West Census Region				
20	Food and Kindred Products	197	6,521	1,888	639	93
21	Tobacco Manufactures	0	0	0	0	0
22	Textile Mill Products	3	197	0	4	3
23	Apparel and Other Textile Products	1	188	0	0	1
24	Lumber and Wood Products	130	5,071	70	W	7
25	Furniture and Fixtures	NA	NA	NA	NA	NA
26	Paper and Allied Products	317	11,571	3,143	147	59
2621	*Paper Mills, Except Building Paper*	W	6,630	1,082	W	W
2631	*Paperboard Mills*	120	2,238	1,081	56	W
27	Printing and Publishing	9	1,471	0	Q	W
28	Chemicals and Allied Products	119	10,244	191	141	61
2819	*Industrial Inorganic Chemicals*	43	4,109	168	120	9
2821	*Plastics Materials and Resins*	1	99	0	W	W
2869	*Industrial Organic Chemicals*	3	-67	W	W	3
2873	*Nitrogenous Fertilizers*	W	W	0	1	29
29	Petroleum and Coal Products	555	7,995	3,816	W	W
2911	*Petroleum Refining*	549	8,055	W	W	W
30	Rubber and Misc. Plastics Products	16	2,358	75	43	6
31	Leather and Leather Products	1	75	0	*	1
32	Stone, Clay and Glass Products	142	4,779	746	1,104	48
3241	*Cement, Hydraulic*	74	2,222	37	142	4
33	Primary Metal Industries	229	32,312	W	303	60
3312	*Blast Furnaces and Steel Mills*	W	1,964	W	W	15
3334	*Primary Aluminum*	W	23,264	W	16	W
34	Fabricated Metal Products	31	3,122	0	109	18
35	Machinery, Except Electrical	21	3,960	0	22	7
36	Electric and Electronic Equipment	W	6,802	0	Q	9
37	Transportation Equipment	40	5,547	W	163	16
38	Instruments and Related Products	10	1,601	Q	Q	5
39	Misc. Manufacturing Industries	3	317	0	0	2
	Total	1,859	104,426	10,611	4,746	495

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system. See Appendix A.

[b] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

[c] "Major Byproduct" fuels include coke oven and blast furnace gas (produced primarily in the blast furnace industry, SIC 3312); still gas (produced primarily in refineries, SIC 2911); and pulping liquor (produced primarily in pulp and paper mills, SIC 2611 and 2621).

[d] "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power.

*Estimate less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Notes: oTotals may not equal sum of components because of independent rounding. oThe estimates presented in this table are for the total consumption of energy for the production of heat and power, regardless of where the energy was produced. Specifically, the estimates include the quantities of energy that were originally produced offsite and purchased by or transferred to the establishment, plus those that were produced onsite from other energy or input materials not classified as energy, or were extracted from captive (onsite) mines or wells.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 3. Total Inputs of Energy for Heat, Power, and Electricity Generation by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Major Byproducts[c] (trillion Btu)	Other[d] (trillion Btu)
		West Census Region				
20	Food and Kindred Products	23	1,013	45	0	38
21	Tobacco Manufactures	0	0	0	0	0
22	Textile Mill Products	*	0	0	0	Q
23	Apparel and Other Textile Products	Q	0	0	0	0
24	Lumber and Wood Products	12	0	0	0	97
25	Furniture and Fixtures	NA	NA	NA	NA	NA
26	Paper and Allied Products	7	490	0	119	65
2621	*Paper Mills, Except Building Paper*	2	W	0	W	24
2631	*Paperboard Mills*	1	W	0	53	27
27	Printing and Publishing	1	0	0	0	*
28	Chemicals and Allied Products	W	763	0	0	W
2819	*Industrial Inorganic Chemicals*	*	763	0	0	2
2821	*Plastics Materials and Resins*	W	0	0	0	*
2869	*Industrial Organic Chemicals*	*	0	0	0	W
2873	*Nitrogenous Fertilizers*	*	0	0	0	*
29	Petroleum and Coal Products	W	0	0	286	95
2911	*Petroleum Refining*	W	0	0	286	W
30	Rubber and Misc. Plastics Products	Q	0	0	0	*
31	Leather and Leather Products	*	0	0	0	*
32	Stone, Clay and Glass Products	W	W	Q	0	4
3241	*Cement, Hydraulic*	*	2,664	0	0	3
33	Primary Metal Industries	6	W	W	W	6
3312	*Blast Furnaces and Steel Mills*	*	W	W	W	W
3334	*Primary Aluminum*	W	0	0	0	*
34	Fabricated Metal Products	W	0	0	0	W
35	Machinery, Except Electrical	Q	0	0	0	Q
36	Electric and Electronic Equipment	Q	0	0	0	W
37	Transportation Equipment	2	0	W	0	2
38	Instruments and Related Products	Q	0	0	0	*
39	Misc. Manufacturing Industries	Q	0	0	0	0
	Total	W	W	W	421	311

Table 4. Total Inputs of Energy for Heat, Power, and Electricity Generation by Economic Characteristics of the Establishment, 1985

(Estimates in Btu or Physical Units)

Establishment Characteristics[a]	Total (trillion Btu)	Net Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Major By-products[c] (trillion Btu)	Other[d] (trillion Btu)
Value of Shipments and Receipts (million dollars)										
Under 20	1,591	119,784	7,992	17,052	649	W	5,685	W	2	W
20-49	1,512	102,789	10,063	5,353	585	W	9,800	350	35	W
50-99	1,416	82,613	11,984	2,463	548	77	8,382	430	121	155
100-249	2,712	138,260	16,280	W	898	82	W	W	478	357
250-499	1,859	88,541	10,994	W	619	49	W	W	299	200
500 and Over	4,525	104,949	22,940	W	1,212	554	W	W	1,479	586
Total	13,615	636,937	80,252	31,684	4,512	1,116	59,195	23,808	2,415	1,687
Employment Size										
Under 50	592	45,052	2,845	9,279	248	113	W	W	Q	63
50-99	667	40,873	3,420	4,631	311	77	2,572	109	26	66
100-249	2,023	106,640	13,021	6,465	752	181	13,401	491	166	276
250-499	2,270	109,834	13,254	3,797	839	136	8,859	409	340	367
500-999	2,854	138,467	16,532	2,793	878	218	W	W	713	384
1,000 and over	5,209	196,070	31,180	4,720	1,484	391	22,758	22,379	1,162	532
Total	13,615	636,937	80,252	31,684	4,512	1,116	59,195	23,808	2,415	1,687

[a] Value of Shipments and Receipts and Employment Size were supplied by the Bureau of the Census. See Appendix A.

[b] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

[c] "Major Byproduct" fuels include coke oven and blast furnace gas (produced primarily in the blast furnace and steel mill industry, SIC 3312); still gas (produced primarily in petroleum refineries, SIC 2911); and pulping liquor (produced primarily in pulp and paper mills, SIC 2611 and 2621).

[d] "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The estimates presented in this table are for the total consumption of energy for the production of heat and power, regardless of where the energy was produced. Specifically, the estimates include the quantities of energy that were originally produced offsite and purchased by or transferred to the establishment, plus those that were produced onsite from other energy or from input materials not classified as energy, or were extracted from captive (onsite) mines or wells.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 5. Total Primary Consumption of Combustible Energy for Nonfuel Purposes by Census Region, Industry Group, and Selected Industries, 1985

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[b] (trillion Btu)
		Total United States							
20	Food and Kindred Products	3	1	Q	2	1	0	0	*
21	Tobacco Manufactures	0	0	0	0	0	0	0	0
22	Textile Mill Products	1	*	Q	Q	*	0	0	*
23	Apparel and Other Textile Products	Q	0	0	Q	*	0	0	*
24	Lumber and Wood Products	1	Q	66	Q	Q	0	0	*
25	Furniture and Fixtures	Q	0	0	0	0	0	0	Q
26	Paper and Allied Products	19	W	85	6	Q	0	0	W
2621	*Paper Mills, Except Building Paper*	1	0	25	1	0	0	0	0
2631	*Paperboard Mills*	16	133	33	5	*	0	0	10
27	Printing and Publishing	*	W	*	0	*	0	0	Q
28	Chemicals and Allied Products	1,354	5,250	1,808	475	W	643	W	73
2819	*Industrial Inorganic Chemicals*	23	28	26	4	*	125	533	2
2821	*Plastics Materials and Resins*	323	0	Q	W	3,243	W	0	1
2869	*Industrial Organic Chemicals*	459	W	64	122	3,671	W	0	W
2873	*Nitrogenous Fertilizers*	268	0	3	259	W	0	0	W
29	Petroleum and Coal Products	2,492	Q	Q	0	0	0	0	2,479
2911	*Petroleum Refining*[c]	2,449	0	0	0	0	0	0	2,449
30	Rubber and Misc. Plastics Products	1	0	Q	*	4	W	0	Q
31	Leather and Leather Products	Q	0	Q	0	0	0	0	Q
32	Stone, Clay and Glass Products	15	Q	Q	Q	4	Q	Q	*
3241	*Cement, Hydraulic*	*	0	15	*	*	0	0	*
33	Primary Metal Industries	1,096	0	206	5	Q	38,041	942	15
3312	*Blast Furnaces and Steel Mills*	1,053	0	46	Q	*	37,705	357	2
3334	*Primary Aluminum*	14	0	0	W	0	19	W	7
34	Fabricated Metal Products	4	0	21	3	2	Q	12	*
35	Machinery, Except Electrical	2	0	Q	1	1	0	0	*
36	Electric and Electronic Equipment	3	0	W	1	2	W	18	1
37	Transportation Equipment	5	0	128	3	2	0	Q	1
38	Instruments and Related Products	*	W	W	*	*	0	0	*
39	Misc. Manufacturing Industries	*	0	Q	*	1	0	0	*
	Total	4,997	7,006	4,267	500	8,366	38,786	1,634	2,582
		Northeast Census Region							
20	Food and Kindred Products	*	0	Q	Q	Q	0	0	*
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	Q	0	0	0	Q	0	0	0
23	Apparel and Other Textile Products	0	0	0	0	0	0	0	0
24	Lumber and Wood Products	0	0	0	0	0	0	0	0
25	Furniture and Fixtures	0	0	0	0	0	0	0	0
26	Paper and Allied Products	W	Q	W	W	Q	0	0	W
2621	*Paper Mills, Except Building Paper*	W	0	13	W	0	0	0	0
2631	*Paperboard Mills*	Q	0	0	0	Q	0	0	0
27	Printing and Publishing	Q	0	0	0	0	0	0	Q
28	Chemicals and Allied Products	Q	0	Q	2	Q	*	0	1
2819	*Industrial Inorganic Chemicals*	*	0	*	*	*	*	0	*
2821	*Plastics Materials and Resins*	W	0	W	0	W	0	0	*
2869	*Industrial Organic Chemicals*	Q	0	W	W	Q	0	0	*
2873	*Nitrogenous Fertilizers*	*	0	0	0	0	0	0	*
29	Petroleum and Coal Products	241	Q	Q	Q	0	0	0	240
2911	*Petroleum Refining*[c]	240	0	0	0	0	0	0	240
30	Rubber and Misc. Plastics Products	*	0	*	*	Q	0	0	0
31	Leather and Leather Products	Q	0	0	0	0	0	0	Q
32	Stone, Clay and Glass Products	*	Q	24	*	*	0	0	*
3241	*Cement, Hydraulic*	*	0	10	*	*	0	0	*
33	Primary Metal Industries	285	0	Q	Q	Q	W	155	2
3312	*Blast Furnaces and Steel Mills*	W	0	W	0	0	W	W	W
3334	*Primary Aluminum*	W	0	0	0	0	W	0	W
34	Fabricated Metal Products	1	0	Q	1	1	0	W	Q
35	Machinery, Except Electrical	*	0	Q	Q	*	0	0	Q
36	Electric and Electronic Equipment	W	0	W	*	2	0	W	W
37	Transportation Equipment	1	0	W	W	W	0	0	*
38	Instruments and Related Products	Q	0	0	Q	Q	0	0	0
39	Misc. Manufacturing Industries	*	0	*	*	1	0	0	*
	Total	571	Q	403	5	Q	W	171	244

See footnotes at end of table.

Table 5. Total Primary Consumption of Combustible Energy for Nonfuel Purposes by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[b] (trillion Btu)
		Midwest Census Region							
20	Food and Kindred Products	1	1	Q	1	1	0	0	*
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	*	0	0	0	*	0	0	Q
24	Lumber and Wood Products	*	0	W	0	*	0	0	*
25	Furniture and Fixtures	Q	0	0	0	0	0	0	Q
26	Paper and Allied Products	W	Q	W	Q	0	0	0	Q
2621	*Paper Mills, Except Building Paper*	*	0	W	0	0	0	0	0
2631	*Paperboard Mills*	Q	Q	Q	0	0	0	0	Q
27	Printing and Publishing	Q	0	Q	0	Q	0	0	0
28	Chemicals and Allied Products	164	0	Q	58	W	*	0	W
2819	*Industrial Inorganic Chemicals*	1	0	0	*	0	*	0	*
2821	*Plastics Materials and Resins*	W	0	W	W	W	0	0	W
2869	*Industrial Organic Chemicals*	15	0	W	W	W	0	0	W
2873	*Nitrogenous Fertilizers*	42	0	W	W	W	0	0	W
29	Petroleum and Coal Products	357	Q	Q	0	0	0	0	355
2911	*Petroleum Refining*[c]	352	0	0	0	0	0	0	352
30	Rubber and Misc. Plastics Products	1	0	Q	Q	Q	W	0	Q
31	Leather and Leather Products	Q	0	Q	0	0	0	0	0
32	Stone, Clay and Glass Products	Q	0	34	Q	1	Q	Q	*
3241	*Cement, Hydraulic*	W	0	W	0	0	0	0	0
33	Primary Metal Industries	541	0	56	3	Q	18,263	541	3
3312	*Blast Furnaces and Steel Mills*	526	0	W	Q	*	18,202	W	W
3334	*Primary Aluminum*	W	0	0	0	0	W	W	W
34	Fabricated Metal Products	1	0	4	Q	1	Q	0	Q
35	Machinery, Except Electrical	1	0	2	1	1	0	0	*
36	Electric and Electronic Equipment	*	0	W	*	Q	W	W	W
37	Transportation Equipment	3	0	W	2	1	0	Q	W
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	Q	0	0	Q	0	0	0	Q
	Total	1,075	Q	Q	67	999	18,364	550	376
		South Census Region							
20	Food and Kindred Products	1	0	Q	1	Q	0	0	0
21	Tobacco Manufactures	0	0	0	0	0	0	0	0
22	Textile Mill Products	Q	0	Q	Q	*	0	0	*
23	Apparel and Other Textile Products	Q	0	0	Q	0	0	0	Q
24	Lumber and Wood Products	Q	0	Q	Q	Q	0	0	Q
25	Furniture and Fixtures	0	0	0	0	0	0	0	0
26	Paper and Allied Products	13	W	W	5	Q	0	0	8
2621	*Paper Mills, Except Building Paper*	W	0	W	0	0	0	0	0
2631	*Paperboard Mills*	13	33	27	4	*	0	0	8
27	Printing and Publishing	*	W	0	0	W	0	0	0
28	Chemicals and Allied Products	1,089	5,250	971	362	W	643	W	57
2819	*Industrial Inorganic Chemicals*	15	28	7	4	*	125	255	1
2821	*Plastics Materials and Resins*	247	0	Q	W	W	W	0	W
2869	*Industrial Organic Chemicals*	414	W	W	110	3,318	W	0	W
2873	*Nitrogenous Fertilizers*	178	0	W	W	W	0	0	0
29	Petroleum and Coal Products	1,568	Q	Q	0	0	0	0	1,557
2911	*Petroleum Refining*[c]	1,547	0	0	0	0	0	0	1,547
30	Rubber and Misc. Plastics Products	*	0	Q	Q	W	0	0	Q
31	Leather and Leather Products	0	0	0	0	0	0	0	0
32	Stone, Clay and Glass Products	Q	Q	Q	Q	Q	0	Q	*
3241	*Cement, Hydraulic*	W	0	W	0	0	0	0	0
33	Primary Metal Industries	228	0	41	2	*	8,002	203	6
3312	*Blast Furnaces and Steel Mills*	211	0	27	0	0	7,781	73	*
3334	*Primary Aluminum*	5	0	0	W	0	13	W	2
34	Fabricated Metal Products	2	0	Q	2	Q	0	Q	*
35	Machinery, Except Electrical	*	0	Q	Q	Q	0	0	*
36	Electric and Electronic Equipment	1	0	0	*	W	0	W	W
37	Transportation Equipment	1	0	W	W	*	0	0	Q
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	*	0	*	*	0	0	0	*
	Total	2,917	6,716	2,613	374	6,938	8,645	592	1,629

See footnotes at end of table.

Table 5. Total Primary Consumption of Combustible Energy for Nonfuel Purposes by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[b] (trillion Btu)
		West Census Region							
20	Food and Kindred Products	*	0	0	*	Q	0	0	Q
21	Tobacco Manufactures	0	0	0	0	0	0	0	0
22	Textile Mill Products	0	0	0	0	0	0	0	0
23	Apparel and Other Textile Products	Q	0	0	Q	0	0	0	0
24	Lumber and Wood Products	Q	Q	Q	0	Q	0	0	*
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	1	100	18	*	*	0	0	*
2621	*Paper Mills, Except Building Paper*	W	0	W	0	0	0	0	0
2631	*Paperboard Mills*	1	100	2	*	*	0	0	0
27	Printing and Publishing	*	0	*	0	0	0	0	0
28	Chemicals and Allied Products	62	0	20	52	W	0	278	W
2819	*Industrial Inorganic Chemicals*	8	0	19	*	Q	0	278	*
2821	*Plastics Materials and Resins*	*	0	0	0	*	0	0	0
2869	*Industrial Organic Chemicals*	0	0	0	0	0	0	0	0
2873	*Nitrogenous Fertilizers*	49	0	0	47	*	0	0	*
29	Petroleum and Coal Products	327	0	Q	0	0	0	0	326
2911	*Petroleum Refining*[c]	310	0	0	0	0	0	0	310
30	Rubber and Misc. Plastics Products	Q	0	0	0	Q	0	0	0
31	Leather and Leather Products	0	0	0	0	0	0	0	0
32	Stone, Clay and Glass Products	*	Q	18	Q	*	0	0	*
3241	*Cement, Hydraulic*	0	0	0	0	0	0	0	0
33	Primary Metal Industries	43	0	W	Q	*	W	43	4
3312	*Blast Furnaces and Steel Mills*	W	0	0	0	0	W	0	Q
3334	*Primary Aluminum*	4	0	0	0	0	W	W	3
34	Fabricated Metal Products	*	0	0	*	Q	0	0	Q
35	Machinery, Except Electrical	Q	0	Q	Q	0	0	0	0
36	Electric and Electronic Equipment	W	0	0	0	0	0	0	W
37	Transportation Equipment	Q	0	0	Q	Q	0	0	Q
38	Instruments and Related Products	Q	0	0	0	0	0	0	Q
39	Misc. Manufacturing Industries	Q	0	Q	0	0	0	0	0
	Total	435	162	128	54	6	W	321	332

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

[b] "Other" includes all other energy that respondents indicated was used for nonfuel purposes, i.e., as petrochemical feedstocks or raw material inputs. See also footnote "c.",

[c] For the petroleum refining industry only, the feetstocks and raw material inputs for the production of nonenergy products (i.e., asphalt, waxes, lubricants, and solvents) are included in the "other" column, regardless of the type of energy. Those inputs and feedstocks that are converted to energy products (e.g., the conversion of crude oil to residual and distillate fuel oils and motor gasoline) are excluded. See Appendix A for more information.

*Estimate less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table are for the primary consumption of energy as feedstocks or raw material inputs. Primary consumption is defined as consumption of energy that was originally produced offsite or was produced onsite from input materials not classified as energy. Examples of the latter are hydrogen produced from the electrolysis of brine; the output of captive (onsite) mines or wells; woodchips, bark, and woodwaste from wood purchased as a raw material input; and waste materials such as wastepaper and packing materials. Primary consumption excludes quantities of energy that are produced from other energy inputs and therefore avoids double-counting.

Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Office of Oil and Gas, Petroleum Supply Division, Form EIA-810, "Monthly Refinery Report," for 1985.

Table 6. Total Primary Consumption of Combustible Energy for Nonfuel Purposes by Economic Characteristics of the Establishment, 1985

(Estimates in Btu or Physical Units)

Establishment Characteristics[a]	Total (trillion Btu)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[b] (trillion Btu)
Value of Shipments and Receipts (million dollars)								
Under 20	121	1,724	2,705	22	Q	562	Q	Q
20-49	174	5,090	208	70	Q	1,266	329	W
50-99	225	3	114	59	373	3,758	293	23
100-249	379	150	W	155	1,387	W	W	22
250-499	567	41	W	157	2,819	W	W	27
500 and Over	1,083	0	W	36	3,250	W	W	29
Not ascertained[c]	2,449	0	0	0	0	0	0	2,449
Total	4,997	7,006	4,267	500	8,366	38,786	1,634	2,582
Employment Size								
Under 50	104	Q	Q	23	Q	W	Q	Q
50-99	102	2,164	Q	56	124	49	5	Q
100-249	251	4,522	117	93	608	1,592	255	24
250-499	453	111	319	184	1,799	3,172	427	13
500-999	349	36	87	104	2,203	W	W	19
1,000 and Over	1,287	58	1,154	42	3,035	33,192	405	45
Not ascertained[c]	2,449	0	0	0	0	0	0	2,449
Total	4,997	7,006	4,267	500	8,366	38,786	1,634	2,582

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.

[b] "Other" includes all other energy that respondents indicated was used for nonfuel purposes, i.e., as petrochemical feedstocks or raw material inputs. See also footnote "c.",

[c] The entry in the "Not ascertained" row and the "Other" column consists of the feedstocks and raw material inputs that were consumed by petroleum refineries for the production of nonenergy products (i.e., asphalt, waxes, lubricants, and solvents). That entry includes all of those inputs, regardless of type. Those inputs that were converted to other energy products by petroleum refineries (e.g., crude oil converted to residual and distillate fuel oils) are excluded. See Appendix A for more information.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table are for the primary consumption of energy as feedstocks or raw material inputs. Primary consumption is defined as consumption of energy that was originally produced offsite or was produced onsite from input materials not classified as an energy. Examples of the latter are hydrogen produced from the electrolysis of brine; the output of captive (onsite) mines or wells; woodchips, bark, and woodwaste from wood purchased as a raw material input; and waste materials such as wastepaper and packing materials. Primary consumption excludes quantities of energy that are produced from other energy inputs and therefore avoids double-counting.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 7. Total Consumption of Offsite-Produced Energy for Heat and Power by Census Region, Industry Group, and Selected Industries, 1985

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[c] (trillion Btu)
					Total United States					
20	Food and Kindred Products	876	45,288	6,290	4,215	462	88	5,571	122	47
21	Tobacco Manufactures	20	1,392	308	55	3	1	407	0	*
22	Textile Mill Products	247	25,540	2,858	922	89	24	1,631	0	8
23	Apparel and Other Textile Products	31	4,030	165	372	11	4	70	0	*
24	Lumber and Wood Products	167	14,287	W	3,911	24	33	W	0	65
25	Furniture and Fixtures	41	4,244	145	342	18	8	89	0	3
26	Paper and Allied Products	1,340	54,386	24,583	1,963	387	56	14,015	0	275
2621	*Paper Mills, Except Building Paper*	632	29,575	12,567	1,030	152	24	8,315	0	104
2631	*Paperboard Mills*	428	10,390	6,697	197	124	5	4,626	0	119
27	Printing and Publishing	76	11,192	75	256	31	11	36	0	3
28	Chemicals and Allied Products	2,170	126,681	11,249	2,600	1,113	96	13,751	0	196
2819	*Industrial Inorganic Chemicals*	262	33,509	1,220	515	100	4	1,320	0	5
2821	*Plastics Materials and Resins*	207	11,921	863	250	W	4	W	0	26
2869	*Industrial Organic Chemicals*	675	20,179	1,899	755	389	79	4,044	0	93
2873	*Nitrogenous Fertilizers*	211	3,958	W	25	190	*	0	0	W
29	Petroleum and Coal Products	917	35,755	1,613	1,992	682	39	339	0	60
2911	*Petroleum Refining*	861	34,142	286	7	656	15	336	0	56
30	Rubber and Misc. Plastics Products	211	25,803	1,729	730	94	25	312	0	3
31	Leather and Leather Products	13	1,053	378	199	4	2	32	0	*
32	Stone, Clay and Glass Products	878	30,801	1,491	5,643	372	44	14,503	143	20
3241	*Cement, Hydraulic*	316	9,926	W	643	16	1	11,529	W	W
33	Primary Metal Industries	1,537	142,071	6,405	2,098	665	58	3,635	8,344	21
3312	*Blast Furnaces and Steel Mills*	823	40,580	5,458	942	399	5	2,183	6,885	14
3334	*Primary Aluminum*	234	61,663	W	52	21	W	0	0	1
34	Fabricated Metal Products	297	26,840	801	1,721	168	46	329	32	5
35	Machinery, Except Electrical	241	28,975	1,150	1,298	100	35	741	24	3
36	Electric and Electronic Equipment	209	30,949	984	552	79	15	371	4	2
37	Transportation Equipment	322	33,737	2,630	1,501	121	28	1,860	32	12
38	Instruments and Related Products	74	7,736	W	195	20	Q	W	0	1
39	Misc. Manufacturing Industries	30	3,191	312	164	14	3	48	0	*
	Total	9,698	653,968	64,557	30,728	4,456	618	58,584	8,702	723
					Northeast Census Region					
20	Food and Kindred Products	104	5,958	2,093	1,207	49	7	108	0	Q
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	29	1,887	1,347	336	10	7	25	0	1
23	Apparel and Other Textile Products	7	751	112	245	2	Q	0	0	*
24	Lumber and Wood Products	11	925	Q	Q	2	Q	0	0	*
25	Furniture and Fixtures	7	495	48	132	3	Q	Q	0	Q
26	Paper and Allied Products	203	8,622	10,574	W	W	26	1,160	0	W
2621	*Paper Mills, Except Building Paper*	145	5,959	8,427	163	20	17	1,126	0	25
2631	*Paperboard Mills*	16	468	957	Q	W	1	W	0	*
27	Printing and Publishing	14	2,078	Q	173	4	Q	Q	0	W
28	Chemicals and Allied Products	170	11,317	5,868	1,287	45	3	1,022	0	17
2819	*Industrial Inorganic Chemicals*	11	487	490	123	4	1	10	0	*
2821	*Plastics Materials and Resins*	24	1,307	639	171	W	*	W	0	W
2869	*Industrial Organic Chemicals*	31	1,791	596	545	5	Q	0	0	13
2873	*Nitrogenous Fertilizers*	W	W	W	*	*	*	0	0	W
29	Petroleum and Coal Products	47	2,528	W	W	W	*	W	0	*
2911	*Petroleum Refining*	29	1,902	Q	W	16	Q	W	0	*
30	Rubber and Misc. Plastics Products	38	5,060	796	312	11	12	0	0	1
31	Leather and Leather Products	5	317	303	92	W	1	29	0	W
32	Stone, Clay and Glass Products	137	5,322	412	891	69	11	W	W	W
3241	*Cement, Hydraulic*	37	1,249	Q	93	Q	*	1,299	0	2
33	Primary Metal Industries	234	21,173	W	610	116	15	669	W	5
3312	*Blast Furnaces and Steel Mills*	139	9,355	W	W	82	3	265	W	5
3334	*Primary Aluminum*	W	W	W	W	W	*	0	0	*
34	Fabricated Metal Products	64	5,418	543	1,008	32	10	W	9	W
35	Machinery, Except Electrical	50	5,905	1,065	670	17	8	79	Q	*
36	Electric and Electronic Equipment	53	7,808	823	361	17	4	W	W	W
37	Transportation Equipment	43	3,935	1,281	416	W	10	W	0	2
38	Instruments and Related Products	39	2,549	1,025	W	6	*	W	0	W
39	Misc. Manufacturing Industries	12	1,321	W	W	4	1	W	0	Q
	Total	1,266	93,433	29,103	10,551	465	123	6,059	304	73

See footnotes at end of table.

Table 7. Total Consumption of Offsite-Produced Energy for Heat and Power by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[c] (trillion Btu)
	Midwest Census Region									
20	Food and Kindred Products	368	16,745	913	689	196	Q	3,934	71	8
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	4	455	42	22	2	Q	12	0	*
24	Lumber and Wood Products	18	1,548	W	W	6	7	W	0	2
25	Furniture and Fixtures	15	1,116	W	Q	W	1	W	0	1
26	Paper and Allied Products	271	10,665	695	W	W	11	4,976	0	W
2621	*Paper Mills, Except Building Paper*	138	4,849	462	108	33	2	2,974	0	17
2631	*Paperboard Mills*	56	1,904	109	16	14	1	1,177	0	9
27	Printing and Publishing	32	3,836	W	Q	16	2	12	0	W
28	Chemicals and Allied Products	377	32,752	620	225	149	4	3,482	0	Q
2819	*Industrial Inorganic Chemicals*	78	16,321	168	24	14	*	204	0	2
2821	*Plastics Materials and Resins*	42	2,663	116	W	20	W	W	0	W
2869	*Industrial Organic Chemicals*	55	1,713	W	52	15	*	1,243	0	6
2873	*Nitrogenous Fertilizers*	54	1,291	0	5	48	*	0	0	*
29	Petroleum and Coal Products	78	5,659	W	285	W	Q	55	0	1
2911	*Petroleum Refining*	63	5,274	Q	0	42	*	W	0	W
30	Rubber and Misc. Plastics Products	78	9,240	143	64	39	5	192	0	1
31	Leather and Leather Products	4	408	W	Q	2	*	2	0	*
32	Stone, Clay and Glass Products	262	8,625	122	1,366	105	5	4,887	73	6
3241	*Cement, Hydraulic*	93	2,605	28	211	5	*	3,369	W	W
33	Primary Metal Industries	746	47,072	1,960	695	342	29	2,255	6,112	12
3312	*Blast Furnaces and Steel Mills*	485	18,647	1,958	509	225	1	1,604	5,232	8
3334	*Primary Aluminum*	W	W	0	W	W	W	0	0	*
34	Fabricated Metal Products	135	11,381	W	324	80	W	264	12	2
35	Machinery, Except Electrical	122	11,805	52	370	59	16	633	22	2
36	Electric and Electronic Equipment	62	6,616	90	46	31	5	268	0	1
37	Transportation Equipment	183	17,205	629	678	72	10	1,544	28	6
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	8	657	Q	W	5	*	W	0	Q
	Total	2,781	187,971	6,005	5,635	1,261	160	22,629	6,316	100
	South Census Region									
20	Food and Kindred Products	237	15,357	1,395	1,680	124	16	517	6	Q
21	Tobacco Manufactures	19	1,353	265	55	3	1	407	0	*
22	Textile Mill Products	208	23,070	1,512	582	72	17	1,586	0	6
23	Apparel and Other Textile Products	18	2,637	Q	105	6	2	59	0	*
24	Lumber and Wood Products	71	6,274	132	1,521	9	11	0	0	30
25	Furniture and Fixtures	17	2,339	86	128	5	5	59	0	1
26	Paper and Allied Products	658	22,306	10,172	958	194	12	7,389	0	149
2621	*Paper Mills, Except Building Paper*	261	11,597	2,596	714	W	3	W	0	39
2631	*Paperboard Mills*	283	5,189	4,550	121	83	2	3,225	0	80
27	Printing and Publishing	21	3,797	53	31	7	3	0	0	1
28	Chemicals and Allied Products	1,522	72,096	4,570	947	860	87	9,047	0	148
2819	*Industrial Inorganic Chemicals*	147	12,586	394	248	75	2	905	0	3
2821	*Plastics Materials and Resins*	141	7,852	108	59	74	2	543	0	24
2869	*Industrial Organic Chemicals*	585	16,627	1,259	W	366	77	2,801	0	W
2873	*Nitrogenous Fertilizers*	124	1,757	W	18	113	*	0	0	W
29	Petroleum and Coal Products	660	19,167	301	Q	518	W	W	0	53
2911	*Petroleum Refining*	643	18,654	W	1	509	W	W	0	50
30	Rubber and Misc. Plastics Products	81	9,144	715	310	38	5	121	0	1
31	Leather and Leather Products	3	253	W	Q	W	Q	Q	0	W
32	Stone, Clay and Glass Products	340	12,073	211	2,283	151	W	5,264	W	W
3241	*Cement, Hydraulic*	115	3,847	W	198	W	*	4,197	W	W
33	Primary Metal Industries	368	41,428	2,257	490	147	9	410	1,901	1
3312	*Blast Furnaces and Steel Mills*	173	10,538	2,235	W	76	1	W	W	W
3334	*Primary Aluminum*	80	20,499	0	20	9	W	0	0	*
34	Fabricated Metal Products	67	6,919	W	279	37	W	W	W	W
35	Machinery, Except Electrical	46	7,304	33	236	18	8	28	*	*
36	Electric and Electronic Equipment	61	9,724	72	128	24	W	W	Q	W
37	Transportation Equipment	56	7,010	W	244	21	W	W	W	2
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	6	894	Q	19	3	Q	0	0	Q
	Total	4,472	264,925	22,449	10,301	2,242	260	25,142	1,959	429

See footnotes at end of table.

Table 7. Total Consumption of Offsite-Produced Energy for Heat and Power by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

(Estimates in Btu or Physical Units)

SIC Code[a]	Industry Groups and Industry	Total (trillion Btu)	Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[c] (trillion Btu)
		West Census Region								
20	Food and Kindred Products	166	7,228	1,888	639	93	23	1,013	45	4
21	Tobacco Manufactures	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	3	197	0	4	3	*	0	0	Q
23	Apparel and Other Textile Products	1	188	0	0	1	Q	0	0	0
24	Lumber and Wood Products	67	5,540	70	1,292	7	12	0	0	32
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	206	12,793	3,143	147	59	7	490	0	70
2621	*Paper Mills, Except Building Paper*	89	7,169	1,082	45	W	2	W	0	23
2631	*Paperboard Mills*	72	2,830	1,081	56	W	1	W	0	30
27	Printing and Publishing	9	1,480	0	Q	3	1	0	0	*
28	Chemicals and Allied Products	104	10,517	191	141	58	1	200	0	2
2819	*Industrial Inorganic Chemicals*	27	4,116	168	120	7	*	200	0	*
2821	*Plastics Materials and Resins*	1	99	0	W	W	W	0	0	*
2869	*Industrial Organic Chemicals*	3	49	W	W	3	*	0	0	W
2873	*Nitrogenous Fertilizers*	W	W	0	1	29	*	0	0	*
29	Petroleum and Coal Products	133	8,401	Q	Q	W	Q	0	0	5
2911	*Petroleum Refining*	126	8,211	W	W	W	W	0	0	W
30	Rubber and Misc. Plastics Products	16	2,358	75	43	6	Q	0	0	Q
31	Leather and Leather Products	1	75	0	0	1	*	0	0	*
32	Stone, Clay and Glass Products	140	4,782	746	1,104	48	W	W	Q	1
3241	*Cement, Hydraulic*	72	2,225	37	142	4	*	2,664	0	1
33	Primary Metal Industries	189	32,398	W	303	60	6	300	W	3
3312	*Blast Furnaces and Steel Mills*	26	2,039	W	W	15	*	W	0	W
3334	*Primary Aluminum*	86	23,264	W	16	6	W	0	0	*
34	Fabricated Metal Products	31	3,122	0	109	18	W	0	0	W
35	Machinery, Except Electrical	21	3,961	0	22	7	Q	0	0	Q
36	Electric and Electronic Equipment	32	6,802	0	Q	8	Q	0	0	*
37	Transportation Equipment	40	5,586	W	163	W	W	0	W	2
38	Instruments and Related Products	10	1,601	Q	Q	5	Q	0	0	*
39	Misc. Manufacturing Industries	3	317	0	0	2	Q	0	0	0
	Total	1,176	107,639	7,000	4,240	489	75	4,754	123	121

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

[b] "Electricity" consists of quantities of electricity that were purchased or transferred in, and is equivalent to "purchased electricity" as defined in the *Annual Survey of Manufactures.*

[c] "Other" includes all other energy that was purchased or transferred in and not shown elsewhere.

*Estimate less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table represent the consumption of energy originally produced offsite, acquired as a result of a purchase or transfer and consumed onsite for the production of heat and power. This definition is consistent with the definition of "purchased" fuels and electric energy used by the Bureau of the Census in the preparation of "Fuels and Electric Energy Consumed," of the *Annual Survey of Manufactures,* for 1974 through 1981. See Appendix A.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 8. Total Consumption of Offsite-Produced Energy for Heat and Power by Economic Characteristics of the Establishment, 1985

(Estimates in Btu or Physical Units)

Establishment Characteristics[a]	Total (trillion Btu)	Electricity[b] (million kWh)	Residual Fuel Oil (1000 bbls)	Distillate Fuel Oil (1000 bbls)	Natural Gas (billion cu ft)	LPG (million gallons)	Coal (1000 short tons)	Coke & Breeze (1000 short tons)	Other[c] (trillion Btu)
Value of Shipments and Receipts (million dollars)									
Under 20	1,486	120,462	7,943	16,985	647	W	5,679	W	W
20-49	1,374	103,943	9,998	5,334	584	W	9,758	350	W
50-99	1,218	83,457	11,739	2,402	548	77	8,382	421	78
100-249	2,109	143,826	15,743	W	895	76	W	W	237
250-499	1,329	89,466	9,879	W	581	29	W	W	88
500 and Over	2,182	112,814	9,255	W	1,201	83	W	W	132
Total	9,698	653,968	64,557	30,728	4,456	618	58,584	8,702	723
Employment Size									
Under 50	566	45,263	2,682	9,278	245	113	W	W	63
50-99	608	41,012	2,875	4,265	311	70	2,573	109	38
100-249	1,665	110,290	10,553	6,278	750	115	13,352	477	97
250-499	1,676	111,526	11,758	3,648	812	113	8,859	400	147
500-999	1,899	141,520	13,299	2,599	870	90	W	W	172
1,000 and Over	3,284	204,358	23,391	4,659	1,468	116	22,758	7,296	205
Total	9,698	653,968	64,557	30,728	4,456	618	58,584	8,702	723

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.

[b] "Electricity" consists of quantities of electricity that were purchased or transferred in, and is equivalent to "purchased electricity" in the *Annual Survey of Manufactures.*

[c] "Other" includes all other energy that was purchased or transferred in and not shown elsewhere.

W = Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •The derived estimates presented in this table represent the consumption of energy originally produced offsite, acquired as a result of a purchase or transfer and consumed onsite for the production of heat and power. This definition is consistent with the definition of "purchased" fuels and electric energy used by the Bureau of the Census in the preparation of "Fuels and Electric Energy Consumed," of the *Annual Survey of Manufactures,* 1974 through 1981. See Appendix A.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 9. Electricity Cogeneration by Census Region, Industry Group, and Selected Industries, 1985

(Million Kilowatthours)

SIC Code[a]	Industry Group and Industry	Total United States	Census Region			
			Northeast	Midwest	South	West
20	Food and Kindred Products	3,618	188	1,079	697	1,655
21	Tobacco Manufactures	W	0	0	W	0
22	Textile Mill Products	305	9	0	296	0
23	Apparel and Other Textile Products	0	0	0	0	0
24	Lumber and Wood Products	Q	0	W	73	Q
25	Furniture and Fixtures	Q	Q	Q	Q	0
26	Paper and Allied Products	32,866	2,878	4,896	21,596	3,496
2621	*Paper Mills, Except Building Paper*	15,510	2,469	3,515	8,384	1,141
2631	*Paperboard Mills*	11,921	117	817	9,287	1,700
27	Printing and Publishing	26	Q	Q	0	W
28	Chemicals and Allied Products	19,827	1,052	W	17,001	W
2819	*Industrial Inorganic Chemicals*	687	0	25	615	47
2821	*Plastics Materials and Resins*	578	W	W	350	0
2869	*Industrial Organic Chemicals*	9,913	W	517	W	W
2873	*Nitrogenous Fertilizers*	W	0	0	W	W
29	Petroleum and Coal Products	5,507	W	W	3,494	1,103
2911	*Petroleum Refining*	5,006	W	W	3,435	666
30	Rubber and Misc. Plastics Products	69	34	0	Q	W
31	Leather and Leather Products	W	0	W	0	0
32	Stone, Clay and Glass Products	207	W	W	0	W
3241	*Cement, Hydraulic*	W	0	0	0	W
33	Primary Metal Industries	4,556	W	2,917	926	W
3312	*Blast Furnaces and Steel Mills*	3,209	W	2,122	W	0
3334	*Primary Aluminum*	*	0	0	*	0
34	Fabricated Metal Products	65	65	0	0	0
35	Machinery, Except Electrical	194	W	W	Q	0
36	Electric and Electronic Equipment	Q	Q	0	*	Q
37	Transportation Equipment	318	W	W	0	W
38	Instruments and Related Products	W	W	0	0	W
39	Misc. Manufacturing Industries	*	*	0	0	0
	Total	69,755	6,235	10,733	44,298	8,489

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

* Estimate less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

Notes: •Totals may not equal sum of components because of independent rounding. •Electricity cogeneration is defined as the production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 10. Selected Operating Ratios for Total Energy Consumption for Heat and Power by Census Region, Industry Group, and Selected Industries, 1985

SIC Code[a]	Industry Group and Industry	Consumption per Employee (million Btu)	Consumption per Dollar of Value Added (thousand Btu)	Consumption per Dollar of Value of Shipments (thousand Btu)	Major Byproducts[b] as a Percent of Consumption (percent)	Fuel Oil[c] as a Percent of Natural Gas (percent)
				Total United States		
20	Food and Kindred Products	667.5	7.9	2.9	Q	13.4
21	Tobacco Manufactures	403.4	1.6	1.1	0	66.0
22	Textile Mill Products	396.9	12.3	4.6	0	25.5
23	Apparel and Other Textile Products	35.8	1.0	0.5	0	28.5
24	Lumber and Wood Products	559.3	16.0	6.7	W	W
25	Furniture and Fixtures	106.5	3.1	1.7	0	15.6
26	Paper and Allied Products	3,440.2	48.9	21.5	33.2	W
2621	*Paper Mills, Except Building Paper*	7,797.0	91.1	40.5	29.7	54.0
2631	*Paperboard Mills*	13,912.7	169.7	70.6	38.6	33.8
27	Printing and Publishing	62.8	1.2	0.8	0	W
28	Chemicals and Allied Products	3,202.7	29.1	13.1	W	7.4
2819	*Industrial Inorganic Chemicals*	3,568.2	36.5	21.2	0	8.8
2821	*Plastics Materials and Resins*	4,767.8	40.7	14.2	W	W
2869	*Industrial Organic Chemicals*	8,588.4	70.4	25.2	W	W
2873	*Nitrogenous Fertilizers*	26,737.7	221.3	66.2	0	W
29	Petroleum and Coal Products	21,943.2	158.9	14.8	44.3	17.3
2911	*Petroleum Refining*	30,156.6	185.5	15.4	45.3	15.0
30	Rubber and Misc. Plastics Products	304.0	6.0	3.0	0	W
31	Leather and Leather Products	91.0	3.3	1.6	0	77.7
32	Stone, Clay and Glass Products	1,712.7	29.8	15.8	W	11.0
3241	*Cement, Hydraulic*	15,417.4	147.8	78.1	W	W
33	Primary Metal Industries	3,270.4	63.1	22.1	19.9	7.6
3312	*Blast Furnaces and Steel Mills*	7,761.4	130.7	44.3	28.3	9.7
3334	*Primary Aluminum*	11,133.0	241.9	48.8	0	W
34	Fabricated Metal Products	223.2	4.6	2.2	0	8.7
35	Machinery, Except Electrical	127.1	2.1	1.1	0	14.3
36	Electric and Electronic Equipment	111.8	2.1	1.2	0	W
37	Transportation Equipment	183.0	2.6	1.1	0	20.3
38	Instruments and Related Products	112.6	1.7	1.1	0	W
39	Misc. Manufacturing Industries	102.1	2.6	1.4	0	20.9
	All Manufacturing	821.5	13.7	6.1	17.7	14.8
				Northeast Census Region		
20	Food and Kindred Products	426.7	5.3	2.1	0	40.1
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	291.4	9.0	3.7	0	100.8
23	Apparel and Other Textile Products	31.0	1.1	0.5	0	104.6
24	Lumber and Wood Products	171.2	5.8	2.6	0	Q
25	Furniture and Fixtures	147.2	4.2	2.3	0	40.3
26	Paper and Allied Products	W	W	W	W	141.5
2621	*Paper Mills, Except Building Paper*	W	W	W	W	W
2631	*Paperboard Mills*	3,830.1	68.5	31.7	0	W
27	Printing and Publishing	W	W	W	0	Q
28	Chemicals and Allied Products	913.8	7.8	4.3	0	95.7
2819	*Industrial Inorganic Chemicals*	1,475.4	18.8	9.2	0	91.2
2821	*Plastics Materials and Resins*	W	W	W	0	69.7
2869	*Industrial Organic Chemicals*	1,860.6	15.2	7.0	0	W
2873	*Nitrogenous Fertilizers*	W	W	W	0	W
29	Petroleum and Coal Products	10,959.9	163.9	12.2	39.9	W
2911	*Petroleum Refining*	20,676.9	456.4	13.3	44.1	W
30	Rubber and Misc. Plastics Products	246.2	5.2	2.6	0	61.1
31	Leather and Leather Products	77.9	3.3	1.5	0	W
32	Stone, Clay and Glass Products	1,439.0	24.1	14.1	W	10.9
3241	*Cement, Hydraulic*	13,916.0	136.8	71.2	W	Q
33	Primary Metal Industries	2,641.6	54.2	19.8	W	W
3312	*Blast Furnaces and Steel Mills*	W	W	W	W	W
3334	*Primary Aluminum*	W	W	W	0	W
34	Fabricated Metal Products	219.7	4.5	2.6	0	27.6
35	Machinery, Except Electrical	116.6	2.2	1.2	0	61.9
36	Electric and Electronic Equipment	W	W	W	0	W
37	Transportation Equipment	173.8	2.4	1.2	0	W
38	Instruments and Related Products	140.9	1.8	1.2	0	125.8
39	Misc. Manufacturing Industries	115.4	2.8	1.5	0	W
	All Manufacturing	463.6	8.1	4.1	13.2	55.8

See footnotes at end of table.

Table 10. Selected Operating Ratios for Total Energy Consumption for Heat and Power by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

SIC Code[a]	Industry Group and Industry	Consumption per Employee (million Btu)	Consumption per Dollar of Value Added (thousand Btu)	Consumption per Dollar of Value of Shipments (thousand Btu)	Major Byproducts[b] as a Percent of Consumption (percent)	Fuel Oil[c] as a Percent of Natural Gas (percent)
		Midwest Census Region				
20	Food and Kindred Products	865.3	10.1	3.2	0	4.8
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	60.6	0.6	0.3	0	18.1
24	Lumber and Wood Products	276.2	8.0	3.5	W	W
25	Furniture and Fixtures	132.0	2.9	1.6	0	W
26	Paper and Allied Products	W	W	W	W	W
2621	*Paper Mills, Except Building Paper*	5,024.5	60.5	28.1	16.0	W
2631	*Paperboard Mills*	7,766.2	95.0	48.4	2.3	5.4
27	Printing and Publishing	76.6	1.5	1.1	0	W
28	Chemicals and Allied Products	2,196.0	19.6	8.8	Q	3.3
2819	*Industrial Inorganic Chemicals*	6,415.7	62.2	31.4	0	8.2
2821	*Plastics Materials and Resins*	W	W	W	0	W
2869	*Industrial Organic Chemicals*	3,576.5	34.1	14.5	0	W
2873	*Nitrogenous Fertilizers*	25,943.4	406.9	64.0	0	W
29	Petroleum and Coal Products	12,704.4	96.8	10.8	56.4	W
2911	*Petroleum Refining*	23,590.6	131.3	11.6	59.0	W
30	Rubber and Misc. Plastics Products	298.0	6.2	3.0	0	W
31	Leather and Leather Products	142.5	4.2	2.2	0	W
32	Stone, Clay and Glass Products	1,925.5	29.8	16.3	0	8.1
3241	*Cement, Hydraulic*	W	W	W	0	W
33	Primary Metal Industries	3,831.9	69.9	26.4	22.7	4.6
3312	*Blast Furnaces and Steel Mills*	9,099.8	147.2	48.6	W	W
3334	*Primary Aluminum*	10,256.5	282.4	48.8	0	W
34	Fabricated Metal Products	245.5	4.8	2.4	0	W
35	Machinery, Except Electrical	169.8	2.8	1.5	0	4.1
36	Electric and Electronic Equipment	148.9	2.7	1.4	0	W
37	Transportation Equipment	269.4	3.6	1.2	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	101.6	2.4	1.3	0	Q
	All Manufacturing	745.5	11.7	5.0	14.2	8.7
		South Census Region				
20	Food and Kindred Products	534.3	5.8	2.5	Q	14.5
21	Tobacco Manufactures	407.8	1.6	1.0	0	63.1
22	Textile Mill Products	426.4	13.6	4.9	0	17.3
23	Apparel and Other Textile Products	35.5	1.3	0.7	0	Q
24	Lumber and Wood Products	792.4	25.2	9.2	0	103.9
25	Furniture and Fixtures	96.4	3.3	1.7	0	24.4
26	Paper and Allied Products	5,953.3	84.7	36.2	40.8	W
2621	*Paper Mills, Except Building Paper*	W	W	W	W	W
2631	*Paperboard Mills*	16,195.6	190.4	78.3	42.7	34.2
27	Printing and Publishing	65.1	1.3	0.8	0	W
28	Chemicals and Allied Products	5,008.8	45.3	18.5	W	3.9
2819	*Industrial Inorganic Chemicals*	3,262.2	33.0	19.8	0	4.2
2821	*Plastics Materials and Resins*	6,873.0	55.0	17.3	W	W
2869	*Industrial Organic Chemicals*	11,793.7	93.2	30.4	W	W
2873	*Nitrogenous Fertilizers*	W	W	W	0	W
29	Petroleum and Coal Products	28,353.7	191.8	16.7	39.5	2.3
2911	*Petroleum Refining*	34,970.2	208.2	17.1	40.1	W
30	Rubber and Misc. Plastics Products	384.8	6.6	3.5	0	W
31	Leather and Leather Products	73.1	2.5	1.3	0	W
32	Stone, Clay and Glass Products	1,547.5	31.9	15.6	W	9.4
3241	*Cement, Hydraulic*	W	W	W	0	W
33	Primary Metal Industries	2,870.8	63.0	18.6	16.9	11.2
3312	*Blast Furnaces and Steel Mills*	6,286.3	121.4	38.5	28.4	W
3334	*Primary Aluminum*	11,214.4	257.8	50.6	0	W
34	Fabricated Metal Products	208.1	4.5	1.7	0	W
35	Machinery, Except Electrical	109.2	1.9	0.9	0	8.6
36	Electric and Electronic Equipment	115.3	2.1	1.1	0	4.9
37	Transportation Equipment	151.3	2.2	0.9	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	87.9	2.4	1.3	0	Q
	All Manufacturing	1,197.0	20.5	8.4	19.5	9.0

See footnotes at end of table.

Table 10. Selected Operating Ratios for Total Energy Consumption for Heat and Power by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

SIC Code[a]	Industry Group and Industry	Consumption per Employee (million Btu)	Consumption per Dollar of Value Added (thousand Btu)	Consumption per Dollar of Value of Shipments (thousand Btu)	Major Byproducts[b] as a Percent of Consumption (percent)	Fuel Oil[c] as a Percent of Natural Gas (percent)
		West Census Region				
20	Food and Kindred Products	825.1	11.8	4.1	0	16.3
21	Tobacco Manufactures	0	0	0	0	0
22	Textile Mill Products	366.5	9.5	3.5	0	.8
23	Apparel and Other Textile Products	24.4	0.9	0.4	0	0
24	Lumber and Wood Products	640.6	15.5	7.2	0	W
25	Furniture and Fixtures	NA	NA	NA	NA	NA
26	Paper and Allied Products	4,451.4	62.1	25.5	37.5	33.7
2621	*Paper Mills, Except Building Paper*	W	W	W	W	W
2631	*Paperboard Mills*	15,863.6	192.2	67.8	43.9	W
27	Printing and Publishing	47.0	0.8	0.6	0	W
28	Chemicals and Allied Products	2,655.4	38.9	16.8	0	3.2
2819	*Industrial Inorganic Chemicals*	3,202.0	32.4	20.7	0	19.3
2821	*Plastics Materials and Resins*	897.6	9.8	2.5	0	W
2869	*Industrial Organic Chemicals*	2,251.5	21.0	10.9	0	W
2873	*Nitrogenous Fertilizers*	W	W	W	0	0
29	Petroleum and Coal Products	25,868.4	146.0	14.7	51.5	W
2911	*Petroleum Refining*	27,982.9	150.5	14.8	52.1	W
30	Rubber and Misc. Plastics Products	214.5	4.8	2.4	0	11.0
31	Leather and Leather Products	90.1	2.8	1.5	0	0
32	Stone, Clay and Glass Products	2,230.5	32.6	17.4	0	22.6
3241	*Cement, Hydraulic*	15,091.9	127.1	69.1	0	26.1
33	Primary Metal Industries	3,083.5	52.2	17.2	W	W
3312	*Blast Furnaces and Steel Mills*	W	W	W	W	W
3334	*Primary Aluminum*	W	W	W	0	W
34	Fabricated Metal Products	184.8	4.0	2.2	0	3.4
35	Machinery, Except Electrical	69.2	0.9	0.5	0	1.8
36	Electric and Electronic Equipment	W	W	W	0	1.1
37	Transportation Equipment	88.0	1.3	0.7	0	W
38	Instruments and Related Products	71.6	1.4	0.9	0	Q
39	Misc. Manufacturing Industries	89.5	2.2	1.2	0	0
	All Manufacturing	692.3	11.6	5.5	22.6	18.5

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

[b] "Major Byproduct" fuels include coke oven and blast furnace gas (produced primarily in the blast furnace industry, SIC 3312); still gas (produced primarily in refineries, SIC 2911); and pulping liquor (produced primarily in pulp and paper mills, SIC 2611 and 2621).

[c] "Fuel Oil" includes distillate and residual.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Bureau of the Census, Industry Division, data files for the "1985 Annual Survey of Manufactures."

Table 11. Selected Operating Ratios for Total Energy Consumption for Heat and Power by Economic Characteristics of the Establishment, 1985

Establishment Characteristics[a]	Consumption per Employee (million Btu)	Consumption per Dollar of Value Added (thousand Btu)	Consumption per Dollar of Value of Shipments (thousand Btu)	Major Byproducts[b] as a Percent of Consumption (percent)	Fuel Oil[c] as a Percent of Natural Gas (percent)
Value of Shipments and Receipts (million dollars)					
Under 20	232.6	6.1	3.2	0.1	22.3
20-49	502.5	9.6	4.4	2.3	15.6
50-99	770.5	12.5	5.5	8.6	15.8
100-249	1,575.1	18.1	8.5	17.5	W
250-499	1,629.7	19.1	8.5	16.1	W
500 and Over	2,218.6	21.1	7.4	32.7	W
All Manufacturing	821.5	13.7	6.1	17.7	14.8
Employment Size					
Under 50	314.7	5.9	2.9	Q	28.1
50-99	359.2	7.5	3.4	3.9	15.1
100-249	595.2	12.1	5.1	8.2	15.4
250-499	826.7	14.3	6.4	15.0	12.2
500-999	1,303.9	20.3	8.6	24.8	13.3
1,000 and Over	1,154.2	15.4	6.8	22.3	14.6
All Manufacturing	821.5	13.7	6.1	17.7	14.8

[a] Value of Shipments and Receipts and Employment Size were supplied by the Bureau of the Census. See Appendix A.

[b] "Major Byproduct" fuels include coke oven and blast furnace gas (produced primarily in the blast furnace industry, SIC 3312); still gas (produced primarily in refineries, SIC 2911); and pulping liquor (produced primarily in pulp and paper mills, SIC 2611 and 2621).

[c] "Fuel Oil" includes distillate and residual.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Bureau of the Census, Industry Division, data files for the "1985 Annual Survey of Manufactures."

Table 12. Average Prices of Selected Purchased Types of Energy by Census Region, Industry Group, and Selected Industries, 1985

Part 1. (Dollars per Physical Unit)

SIC Code[a]	Industry Groups and Industry	Electricity (kWh)	Residual Fuel Oil (gallon)	Distillate Fuel Oil (gallon)	Natural Gas (1000 cu ft)	LPG (gallon)	Coal (short ton)
				Total United States			
20	Food and Kindred Products	0.055	0.643	0.913	4.340	0.579	38.28
21	Tobacco Manufactures	0.048	0.663	0.882	4.756	0.732	49.69
22	Textile Mill Products	0.047	0.715	0.835	4.688	0.584	50.43
23	Apparel and Other Textile Products	0.068	0.744	0.899	5.331	0.661	55.76
24	Lumber and Wood Products	0.054	0.696	0.864	4.710	0.595	W
25	Furniture and Fixtures	0.062	0.730	0.914	5.194	0.632	54.42
26	Paper and Allied Products	0.044	0.635	0.825	4.003	0.648	43.65
2621	*Paper Mills, Except Building Paper*	0.042	0.649	0.800	3.935	0.586	43.74
2631	*Paperboard Mills*	0.043	0.617	0.848	3.771	0.681	43.65
27	Printing and Publishing	0.066	0.695	0.831	5.103	0.856	W
28	Chemicals and Allied Products	0.040	0.649	0.808	3.118	0.446	40.94
2819	*Industrial Inorganic Chemicals*	0.032	0.727	0.813	3.248	0.601	44.97
2821	*Plastics Materials and Resins*	0.046	0.687	0.858	3.202	0.392	40.37
2869	*Industrial Organic Chemicals*	0.041	0.602	0.819	3.215	0.437	38.12
2873	*Nitrogenous Fertilizers*	0.038	W	0.876	2.616	W	0
29	Petroleum and Coal Products	0.050	0.598	0.740	3.341	0.437	40.08
2911	*Petroleum Refining*	0.049	0.530	W	3.294	0.437	40.13
30	Rubber and Misc. Plastics Products	0.057	0.682	0.854	4.479	0.705	46.53
31	Leather and Leather Products	0.067	0.656	0.893	4.899	0.639	39.97
32	Stone, Clay and Glass Products	0.051	0.650	0.953	4.309	0.595	41.20
3241	*Cement, Hydraulic*	0.047	0.627	0.825	4.104	0.703	40.14
33	Primary Metal Industries	0.037	0.625	0.841	4.249	0.557	54.08
3312	*Blast Furnaces and Steel Mills*	0.046	0.615	0.832	4.098	0.655	54.49
3334	*Primary Aluminum*[b]	0.023	W	0.873	4.314	0.438	197.45
34	Fabricated Metal Products	0.060	0.702	0.906	4.835	0.761	50.45
35	Machinery, Except Electrical	0.061	0.694	0.863	4.820	0.763	40.20
36	Electric and Electronic Equipment	0.056	0.712	0.846	4.872	0.649	45.18
37	Transportation Equipment	0.055	0.724	0.856	4.787	0.607	51.62
38	Instruments and Related Products	0.061	0.669	0.850	4.750	Q	W
39	Misc. Manufacturing Industries	0.068	0.741	0.917	5.063	0.860	51.60
	All Manufacturing	0.047	0.648	0.857	3.840	0.454	47.22
				Northeast Census Region			
20	Food and Kindred Products	0.070	0.684	0.869	5.015	0.609	48.52
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	0.070	0.717	0.905	5.283	0.634	W
23	Apparel and Other Textile Products	0.086	0.740	0.914	6.044	W	0
24	Lumber and Wood Products	0.059	W	Q	5.556	Q	0
25	Furniture and Fixtures	0.072	0.727	0.878	6.003	0.709	W
26	Paper and Allied Products	0.056	0.666	0.870	4.499	0.607	43.57
2621	*Paper Mills, Except Building Paper*	0.053	0.659	0.895	4.209	0.564	43.14
2631	*Paperboard Mills*	0.062	0.659	Q	4.282	0.669	W
27	Printing and Publishing	0.079	Q	0.824	5.700	Q	W
28	Chemicals and Allied Products	0.047	0.709	0.860	4.869	W	49.95
2819	*Industrial Inorganic Chemicals*	0.064	0.792	0.872	4.937	0.617	W
2821	*Plastics Materials and Resins*	0.062	0.697	0.822	4.536	W	48.44
2869	*Industrial Organic Chemicals*	0.036	0.680	0.855	4.799	W	0
2873	*Nitrogenous Fertilizers*	0.014	W	W	W	W	0
29	Petroleum and Coal Products	0.063	0.676	0.782	4.309	W	37.96
2911	*Petroleum Refining*	0.058	W	W	4.118	W	37.96
30	Rubber and Misc. Plastics Products	0.072	0.713	0.846	5.220	0.675	0
31	Leather and Leather Products	0.080	0.677	0.942	5.619	0.649	37.66
32	Stone, Clay and Glass Products	0.055	0.673	0.893	4.696	0.551	41.47
3241	*Cement, Hydraulic*	0.050	W	0.850	4.496	0.838	37.38
33	Primary Metal Industries	0.043	0.689	0.861	4.502	0.583	51.75
3312	*Blast Furnaces and Steel Mills*	0.047	0.681	0.863	4.355	0.584	51.92
3334	*Primary Aluminum*[b]	W	0	W	W	W	W
34	Fabricated Metal Products	0.068	0.724	0.883	5.064	0.823	69.33
35	Machinery, Except Electrical	0.072	0.695	0.863	4.943	0.757	52.85
36	Electric and Electronic Equipment	0.058	0.722	0.855	5.346	0.634	W
37	Transportation Equipment	0.066	0.707	0.830	5.212	0.649	W
38	Instruments and Related Products	0.073	0.667	0.853	5.185	0.909	W
39	Misc. Manufacturing Industries	0.073	0.752	0.930	5.712	0.893	52.36
	All Manufacturing	0.058	0.688	0.863	4.801	Q	49.99

See footnotes at end of table.

Table 12. Average Prices of Selected Purchased Types of Energy by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 1. (Dollars per Physical Unit)

SIC Code[a]	Industry Groups and Industry	Electricity (kWh)	Residual Fuel Oil (gallon)	Distillate Fuel Oil (gallon)	Natural Gas (1000 cu ft)	LPG (gallon)	Coal (short ton)
				Midwest Census Region			
20	Food and Kindred Products	0.051	0.600	W	4.207	0.530	37.62
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	0.068	W	W	5.052	Q	W
24	Lumber and Wood Products	0.063	W	0.836	4.815	0.560	W
25	Furniture and Fixtures	0.060	0.737	Q	4.915	0.578	W
26	Paper and Allied Products	0.048	0.590	0.865	4.201	0.714	42.81
2621	*Paper Mills, Except Building Paper*	0.044	0.588	0.864	4.102	0.690	44.18
2631	*Paperboard Mills*	0.043	0.579	0.713	4.210	0.710	41.33
27	Printing and Publishing	0.064	W	Q	4.818	Q	W
28	Chemicals and Allied Products	0.032	0.653	Q	3.894	W	39.48
2819	*Industrial Inorganic Chemicals*	0.020	W	0.726	4.234	0.703	40.06
2821	*Plastics Materials and Resins*	0.039	0.646	W	3.774	W	W
2869	*Industrial Organic Chemicals*	0.042	W	0.816	W	W	35.21
2873	*Nitrogenous Fertilizers*	0.036	0	0.931	3.053	0.486	0
29	Petroleum and Coal Products	0.045	0.510	0.763	3.850	0.589	W
2911	*Petroleum Refining*	0.043	W	0	3.723	0.590	W
30	Rubber and Misc. Plastics Products	0.053	0.557	0.850	4.492	0.714	52.04
31	Leather and Leather Products	0.060	W	W	4.879	0.796	66.89
32	Stone, Clay and Glass Products	0.047	0.607	0.961	4.199	0.691	36.59
3241	*Cement, Hydraulic*	0.042	0.555	0.788	3.679	0.632	33.52
33	Primary Metal Industries	0.041	0.613	0.829	4.191	0.526	55.37
3312	*Blast Furnaces and Steel Mills*	0.048	0.613	0.814	4.057	0.812	56.33
3334	*Primary Aluminum*[b]	0.023	0	W	4.211	W	W
34	Fabricated Metal Products	0.059	0.655	0.886	4.734	0.749	48.63
35	Machinery, Except Electrical	0.057	0.686	0.867	4.754	0.737	38.49
36	Electric and Electronic Equipment	0.054	0.612	0.962	4.678	0.660	44.08
37	Transportation Equipment	0.051	0.664	0.884	4.591	0.553	53.39
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	0.067	W	0.926	4.806	0.711	W
	All Manufacturing	0.046	0.599	0.859	4.259	0.419	47.87
				South Census Region			
20	Food and Kindred Products	0.053	0.641	0.933	4.234	0.613	44.30
21	Tobacco Manufactures	0.048	0.669	0.881	4.801	0.725	49.69
22	Textile Mill Products	0.045	0.711	0.795	4.568	0.562	50.49
23	Apparel and Other Textile Products	0.061	0.753	0.872	5.209	0.680	W
24	Lumber and Wood Products	0.057	0.691	0.832	4.136	0.571	0
25	Furniture and Fixtures	0.058	0.734	0.876	4.969	0.605	54.07
26	Paper and Allied Products	0.043	0.617	0.786	3.655	0.680	44.52
2621	*Paper Mills, Except Building Paper*	0.041	0.634	0.766	3.637	0.620	44.65
2631	*Paperboard Mills*	0.042	0.609	0.871	3.534	0.674	43.67
27	Printing and Publishing	0.057	W	0.917	5.150	0.852	0
28	Chemicals and Allied Products	0.043	0.612	0.846	2.988	0.458	40.46
2819	*Industrial Inorganic Chemicals*	0.048	0.664	0.824	2.863	0.553	46.48
2821	*Plastics Materials and Resins*	0.045	0.659	0.933	2.994	0.443	40.89
2869	*Industrial Organic Chemicals*	0.041	0.584	0.773	3.037	0.429	39.28
2873	*Nitrogenous Fertilizers*	0.039	0	0.874	2.779	W	0
29	Petroleum and Coal Products	0.044	0.623	W	3.198	0.382	W
2911	*Petroleum Refining*	0.043	W	W	3.175	0.382	W
30	Rubber and Misc. Plastics Products	0.048	0.677	0.864	4.100	0.647	37.10
31	Leather and Leather Products	0.065	W	Q	4.847	Q	W
32	Stone, Clay and Glass Products	0.048	0.662	0.984	4.053	0.577	43.31
3241	*Cement, Hydraulic*	0.043	0.703	0.838	4.094	0.708	42.75
33	Primary Metal Industries	0.037	W	0.837	4.107	0.569	55.77
3312	*Blast Furnaces and Steel Mills*	0.042	W	0.836	4.049	W	55.48
3334	*Primary Aluminum*[b]	0.028	0	0.843	4.093	0.505	166.05
34	Fabricated Metal Products	0.052	0.733	W	4.523	0.726	46.64
35	Machinery, Except Electrical	0.054	0.666	0.844	4.539	0.738	W
36	Electric and Electronic Equipment	0.051	0.764	0.782	4.618	0.621	W
37	Transportation Equipment	0.049	0.860	0.812	4.638	0.600	51.23
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	0.058	Q	0.822	4.790	Q	0
	All Manufacturing	0.045	0.628	0.851	3.416	0.446	45.58

See footnotes at end of table.

Table 12. Average Prices of Selected Purchased Types of Energy by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 1. (Dollars per Physical Unit)

SIC Code[a]	Industry Groups and Industry	Electricity (kWh)	Residual Fuel Oil (gallon)	Distillate Fuel Oil (gallon)	Natural Gas (1000 cu ft)	LPG (gallon)	Coal (short ton)
		West Census Region					
20	Food and Kindred Products	0.056	0.616	0.884	4.404	0.634	36.91
21	Tobacco Manufactures	0	0	0	0	0	0
22	Textile Mill Products	0.069	0	W	5.459	0.795	0
23	Apparel and Other Textile Products	0.091	0	0	5.320	W	0
24	Lumber and Wood Products	0.047	0.680	0.879	5.119	0.616	0
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	0.037	0.598	0.824	4.471	0.644	W
2621	*Paper Mills, Except Building Paper*	0.033	0.632	0.807	4.324	0.607	W
2631	*Paperboard Mills*	0.041	0.616	0.847	4.305	0.691	W
27	Printing and Publishing	0.075	0	Q	5.642	0.576	0
28	Chemicals and Allied Products	0.030	0.679	0.745	2.278	0.708	41.99
2819	*Industrial Inorganic Chemicals*	0.025	0.693	0.756	4.355	0.777	41.99
2821	*Plastics Materials and Resins*	0.071	0	0.629	5.431	0.659	0
2869	*Industrial Organic Chemicals*	0.061	W	W	4.823	0.811	0
2873	*Nitrogenous Fertilizers*	0.039	0	W	1.466	W	0
29	Petroleum and Coal Products	0.063	0.619	0.690	3.569	0.626	0
2911	*Petroleum Refining*	0.062	0.601	W	3.536	0.628	0
30	Rubber and Misc. Plastics Products	0.075	0.661	0.862	5.378	Q	0
31	Leather and Leather Products	0.054	0	W	4.158	W	0
32	Stone, Clay and Glass Products	0.059	0.639	0.893	4.818	0.669	45.37
3241	*Cement, Hydraulic*	0.057	W	0.843	4.543	0.861	45.59
33	Primary Metal Industries	0.025	W	0.836	4.434	0.631	48.00
3312	*Blast Furnaces and Steel Mills*	0.041	W	W	3.568	0.766	W
3334	*Primary Aluminum*[b]	0.020	W	0.890	4.603	0.535	267.85
34	Fabricated Metal Products	0.066	0	0.722	5.507	0.796	0
35	Machinery, Except Electrical	0.070	0	W	5.760	0.908	0
36	Electric and Electronic Equipment	0.065	0	0.824	5.283	0.836	0
37	Transportation Equipment	0.066	W	0.875	5.590	0.700	0
38	Instruments and Related Products	0.058	W	Q	4.784	Q	0
39	Misc. Manufacturing Industries	0.075	0	W	4.967	0.762	0
	All Manufacturing	0.045	0.614	0.861	4.002	0.642	44.01

[a] See Appendices A and D for description of the Standard Industrial Classification system.

[b] The price estimates for coal for SIC 3334 includes anthracite coal for the production of carbon anodes. Because of the high cost of transporting anthracite from the east coast to the West and South, the prices of coal in those regions are extremely high.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 12. Average Prices of Selected Purchased Types of Energy by Census Region, Industry Group, and Selected Industries, 1985

Part 2. (Dollars per Million Btu)

SIC Code[a]	Industry Groups and Industry	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
				Total United States			
20	Food and Kindred Products	16.17	4.29	6.58	4.21	6.73	1.74
21	Tobacco Manufactures	14.15	4.43	6.36	4.61	8.51	2.26
22	Textile Mill Products	13.90	4.77	6.02	4.54	6.79	2.29
23	Apparel and Other Textile Products	19.85	4.97	6.48	5.17	7.68	2.46
24	Lumber and Wood Products	15.79	4.65	6.23	4.56	6.92	W
25	Furniture and Fixtures	18.16	4.88	6.59	5.03	7.35	2.46
26	Paper and Allied Products	12.98	4.24	5.95	3.88	7.54	1.98
2621	*Paper Mills, Except Building Paper*	12.23	4.33	5.77	3.81	6.81	1.99
2631	*Paperboard Mills*	12.60	4.12	6.11	3.65	7.92	1.98
27	Printing and Publishing	19.32	4.64	5.99	4.95	9.95	W
28	Chemicals and Allied Products	11.63	4.33	5.83	3.02	5.18	1.86
2819	*Industrial Inorganic Chemicals*	9.31	4.85	5.86	3.15	6.99	2.04
2821	*Plastics Materials and Resins*	13.46	4.59	6.18	3.10	4.55	1.83
2869	*Industrial Organic Chemicals*	11.99	4.02	5.91	3.12	5.08	1.73
2873	*Nitrogenous Fertilizers*	11.10	W	6.32	2.54	W	0
29	Petroleum and Coal Products	14.55	4.00	5.34	3.24	5.08	1.82
2911	*Petroleum Refining*	14.26	3.54	W	3.19	5.08	1.82
30	Rubber and Misc. Plastics Products	16.67	4.56	6.16	4.34	8.20	2.11
31	Leather and Leather Products	19.56	4.38	6.44	4.75	7.43	1.82
32	Stone, Clay and Glass Products	14.85	4.34	6.87	4.18	6.92	1.87
3241	*Cement, Hydraulic*	13.66	4.19	5.95	3.98	8.17	1.82
33	Primary Metal Industries	10.70	4.18	6.06	4.12	6.47	2.46
3312	*Blast Furnaces and Steel Mills*	13.36	4.11	6.00	3.97	7.61	2.48
3334	*Primary Aluminum*[b]	6.64	W	6.29	4.18	5.09	8.75
34	Fabricated Metal Products	17.47	4.69	6.54	4.69	8.85	2.29
35	Machinery, Except Electrical	17.95	4.64	6.23	4.67	8.87	1.83
36	Electric and Electronic Equipment	16.53	4.75	6.10	4.72	7.54	2.05
37	Transportation Equipment	16.11	4.84	6.17	4.64	7.06	2.33
38	Instruments and Related Products	17.82	4.47	6.13	4.60	Q	W
39	Misc. Manufacturing Industries	19.92	4.95	6.61	4.91	10.00	2.26
	All Manufacturing	13.92	4.33	6.18	3.72	5.28	2.14
				Northeast Census Region			
20	Food and Kindred Products	20.40	4.57	6.27	4.86	7.08	2.20
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	20.45	4.79	6.52	5.12	7.37	W
23	Apparel and Other Textile Products	25.31	4.94	6.59	5.86	W	0
24	Lumber and Wood Products	17.36	W	Q	5.38	Q	0
25	Furniture and Fixtures	21.17	4.86	6.33	5.82	8.25	W
26	Paper and Allied Products	16.50	4.45	6.28	4.36	7.05	1.98
2621	*Paper Mills, Except Building Paper*	15.54	4.40	6.45	4.08	6.56	1.96
2631	*Paperboard Mills*	18.31	4.40	Q	4.15	7.79	W
27	Printing and Publishing	23.11	Q	5.94	5.52	Q	W
28	Chemicals and Allied Products	13.88	4.74	6.20	4.72	W	2.25
2819	*Industrial Inorganic Chemicals*	18.75	5.29	6.29	4.78	7.17	W
2821	*Plastics Materials and Resins*	18.11	4.66	5.93	4.40	W	2.17
2869	*Industrial Organic Chemicals*	10.45	4.54	6.17	4.65	W	0
2873	*Nitrogenous Fertilizers*	4.24	W	W	W	W	0
29	Petroleum and Coal Products	18.38	4.52	5.64	4.18	W	1.72
2911	*Petroleum Refining*	17.12	W	W	3.99	W	1.72
30	Rubber and Misc. Plastics Products	21.03	4.77	6.10	5.06	7.85	0
31	Leather and Leather Products	23.32	4.52	6.80	5.45	7.55	1.71
32	Stone, Clay and Glass Products	16.09	4.50	6.44	4.55	6.40	1.88
3241	*Cement, Hydraulic*	14.54	W	6.13	4.36	9.75	1.70
33	Primary Metal Industries	12.67	4.60	6.21	4.36	6.79	2.35
3312	*Blast Furnaces and Steel Mills*	13.77	4.55	6.22	4.22	6.79	2.36
3334	*Primary Aluminum*[b]	W	0	W	W	W	W
34	Fabricated Metal Products	19.82	4.84	6.36	4.91	9.57	3.10
35	Machinery, Except Electrical	21.10	4.65	6.22	4.79	8.81	2.40
36	Electric and Electronic Equipment	16.87	4.82	6.17	5.18	7.38	W
37	Transportation Equipment	19.27	4.72	5.98	5.05	7.55	W
38	Instruments and Related Products	21.25	4.46	6.15	5.02	10.57	W
39	Misc. Manufacturing Industries	21.53	5.03	6.70	5.54	10.38	2.27
	All Manufacturing	17.05	4.60	6.23	4.65	Q	2.27

See footnotes at end of table.

Table 12. Average Prices of Selected Purchased Types of Energy by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 2. (Dollars per Million Btu)

SIC Code[a]	Industry Groups and Industry	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
				Midwest Census Region			
20	Food and Kindred Products	15.05	4.01	W	4.08	6.16	1.71
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	19.98	W	W	4.90	Q	W
24	Lumber and Wood Products	18.59	W	6.03	4.67	6.51	W
25	Furniture and Fixtures	17.50	4.92	Q	4.76	6.73	W
26	Paper and Allied Products	13.96	3.94	6.24	4.07	8.30	1.94
2621	*Paper Mills, Except Building Paper*	12.99	3.93	6.23	3.97	8.03	2.00
2631	*Paperboard Mills*	12.57	3.87	5.14	4.08	8.25	1.88
27	Printing and Publishing	18.69	W	Q	4.67	Q	W
28	Chemicals and Allied Products	9.25	4.36	Q	3.77	W	1.79
2819	*Industrial Inorganic Chemicals*	5.81	W	5.23	4.10	8.18	1.82
2821	*Plastics Materials and Resins*	11.55	4.32	W	3.66	W	W
2869	*Industrial Organic Chemicals*	12.38	W	5.88	W	W	1.60
2873	*Nitrogenous Fertilizers*	10.62	0	6.71	2.96	5.65	0
29	Petroleum and Coal Products	13.12	3.41	5.51	3.73	6.84	W
2911	*Petroleum Refining*	12.70	W	0	3.61	6.86	W
30	Rubber and Misc. Plastics Products	15.58	3.72	6.13	4.35	8.30	2.36
31	Leather and Leather Products	17.64	W	W	4.73	9.26	3.04
32	Stone, Clay and Glass Products	13.84	4.06	6.93	4.07	8.03	1.66
3241	*Cement, Hydraulic*	12.23	3.71	5.68	3.57	7.35	1.52
33	Primary Metal Industries	12.12	4.09	5.98	4.06	6.12	2.52
3312	*Blast Furnaces and Steel Mills*	13.98	4.09	5.87	3.93	9.44	2.56
3334	*Primary Aluminum*[b]	6.65	0	W	4.08	W	W
34	Fabricated Metal Products	17.25	4.38	6.39	4.59	8.71	2.21
35	Machinery, Except Electrical	16.81	4.58	6.25	4.61	8.57	1.75
36	Electric and Electronic Equipment	15.92	4.09	6.93	4.53	7.68	2.00
37	Transportation Equipment	15.09	4.44	6.38	4.45	6.43	2.42
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	19.56	W	6.68	4.66	8.27	W
	All Manufacturing	13.62	4.00	6.19	4.13	4.87	2.17
				South Census Region			
20	Food and Kindred Products	15.59	4.28	6.73	4.10	7.13	1.99
21	Tobacco Manufactures	14.00	4.47	6.35	4.65	8.43	2.26
22	Textile Mill Products	13.27	4.75	5.73	4.43	6.53	2.29
23	Apparel and Other Textile Products	17.78	5.03	6.29	5.05	7.90	W
24	Lumber and Wood Products	16.70	4.61	6.00	4.01	6.64	0
25	Furniture and Fixtures	16.90	4.91	6.32	4.82	7.04	2.45
26	Paper and Allied Products	12.48	4.12	5.67	3.54	7.91	2.02
2621	*Paper Mills, Except Building Paper*	11.90	4.24	5.52	3.52	7.21	2.03
2631	*Paperboard Mills*	12.42	4.07	6.28	3.42	7.84	1.98
27	Printing and Publishing	16.79	W	6.61	4.99	9.91	0
28	Chemicals and Allied Products	12.75	4.09	6.10	2.90	5.33	1.84
2819	*Industrial Inorganic Chemicals*	14.17	4.43	5.94	2.77	6.43	2.11
2821	*Plastics Materials and Resins*	13.24	4.40	6.73	2.90	5.15	1.86
2869	*Industrial Organic Chemicals*	12.10	3.90	5.58	2.94	4.99	1.78
2873	*Nitrogenous Fertilizers*	11.51	0	6.31	2.69	W	0
29	Petroleum and Coal Products	12.76	4.17	W	3.10	4.44	W
2911	*Petroleum Refining*	12.66	W	W	3.08	4.44	W
30	Rubber and Misc. Plastics Products	13.99	4.52	6.23	3.97	7.52	1.69
31	Leather and Leather Products	19.05	W	Q	4.70	Q	W
32	Stone, Clay and Glass Products	14.08	4.42	7.10	3.93	6.72	1.97
3241	*Cement, Hydraulic*	12.59	4.70	6.04	3.97	8.23	1.94
33	Primary Metal Industries	10.75	W	6.04	3.98	6.62	2.53
3312	*Blast Furnaces and Steel Mills*	12.25	W	6.03	3.92	W	2.52
3334	*Primary Aluminum*[b]	8.32	0	6.08	3.97	5.88	7.43
34	Fabricated Metal Products	15.20	4.90	W	4.38	8.45	2.12
35	Machinery, Except Electrical	15.86	4.45	6.09	4.40	8.58	W
36	Electric and Electronic Equipment	14.99	5.10	5.64	4.48	7.22	W
37	Transportation Equipment	14.29	5.75	5.85	4.49	6.98	2.33
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	17.09	Q	5.93	4.64	Q	0
	All Manufacturing	13.31	4.20	6.14	3.31	5.19	2.07

See footnotes at end of table.

Table 12. Average Prices of Selected Purchased Types of Energy by Census Region, Industry Group, and Selected Industries, 1985 (Continued)

Part 2. (Dollars per Million Btu)

SIC Code[a]	Industry Groups and Industry	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
		West Census Region					
20	Food and Kindred Products	16.52	4.12	6.37	4.27	7.37	1.68
21	Tobacco Manufactures	0	0	0	0	0	0
22	Textile Mill Products	20.10	0	W	5.29	9.25	0
23	Apparel and Other Textile Products	26.77	0	0	5.16	W	0
24	Lumber and Wood Products	13.66	4.54	6.34	4.96	7.17	0
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	10.70	4.00	5.94	4.33	7.49	W
2621	*Paper Mills, Except Building Paper*	9.55	4.23	5.82	4.19	7.06	W
2631	*Paperboard Mills*	12.02	4.12	6.11	4.17	8.03	W
27	Printing and Publishing	22.08	0	Q	5.47	6.69	0
28	Chemicals and Allied Products	8.86	4.54	5.37	2.21	8.24	1.91
2819	*Industrial Inorganic Chemicals*	7.26	4.63	5.45	4.22	9.04	1.91
2821	*Plastics Materials and Resins*	20.74	0	4.53	5.26	7.67	0
2869	*Industrial Organic Chemicals*	17.96	W	W	4.67	9.43	0
2873	*Nitrogenous Fertilizers*	11.29	0	W	1.42	W	0
29	Petroleum and Coal Products	18.38	4.14	4.97	3.46	7.29	0
2911	*Petroleum Refining*	18.24	4.02	W	3.43	7.30	0
30	Rubber and Misc. Plastics Products	21.91	4.42	6.21	5.21	Q	0
31	Leather and Leather Products	15.83	0	W	4.03	W	0
32	Stone, Clay and Glass Products	17.23	4.27	6.44	4.67	7.78	2.06
3241	*Cement, Hydraulic*	16.70	W	6.08	4.40	10.01	2.07
33	Primary Metal Industries	7.40	W	6.03	4.30	7.33	2.18
3312	*Blast Furnaces and Steel Mills*	11.89	W	W	3.46	8.91	W
3334	*Primary Aluminum*[b]	5.76	W	6.42	4.46	6.22	11.63
34	Fabricated Metal Products	19.27	0	5.20	5.34	9.26	0
35	Machinery, Except Electrical	20.46	0	W	5.58	10.56	0
36	Electric and Electronic Equipment	18.95	0	5.94	5.12	9.72	0
37	Transportation Equipment	19.28	W	6.31	5.42	8.14	0
38	Instruments and Related Products	17.02	W	Q	4.64	Q	0
39	Misc. Manufacturing Industries	21.98	0	W	4.81	8.86	0
	All Manufacturing	13.18	4.10	6.21	3.88	7.47	2.00

[a] See Appendices A and D for description of the Standard Industrial Classification system.

[b] The price estimates for coal for SIC 3334 includes anthracite coal for the production of carbon anodes. Because of the high cost of transporting anthracite from the east coast to the West and South, the prices of coal in those regions are extremely high.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

NA=Not available. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 13. Average Prices of Selected Purchased Types of Energy by Economic Characteristics of the Establishment, 1985

Establishment Characteristics[a]	Electricity (dollars per kWh)	Residual Fuel Oil (dollars per gallon)	Distillate Fuel Oil (dollars per gallon)	Natural Gas (dollars per 1000 cu ft)	LPG (dollars per gallon)	Coal (dollars per short ton)
Value of Shipments and Receipts (million dollars)						
Under 20	0.061	0.662	0.883	4.646	Q	43.886
20-49	0.052	0.650	0.868	4.302	0.630	42.736
50-99	0.047	0.646	0.875	4.119	0.643	44.458
100-249	0.039	0.640	0.855	3.624	0.472	44.247
250-499	0.040	0.660	0.753	3.274	0.380	45.315
500 and Over	0.045	0.636	0.842	3.535	0.448	52.580
All Manufacturing	0.047	0.648	0.857	3.840	0.454	47.219
Employment Size						
Under 50	0.061	0.677	0.906	4.532	Q	50.062
50-99	0.060	0.631	0.854	4.240	0.751	41.899
100-249	0.052	0.644	0.858	4.063	0.618	41.244
250-499	0.048	0.644	0.795	3.660	0.438	45.654
500-999	0.040	0.659	0.855	3.746	0.396	41.787
1,000 and Over	0.044	0.647	0.844	3.677	0.417	50.576
All Manufacturing	0.047	0.648	0.857	3.840	0.454	47.219

	Electricity (dollars per million Btu)	Residual Fuel Oil (dollars per million Btu)	Distillate Fuel Oil (dollars per million Btu)	Natural Gas (dollars per million Btu)	LPG (dollars per million Btu)	Coal (dollars per million Btu)
Value of Shipments and Receipts (million dollars)						
Under 20	17.868	4.421	6.368	4.501	Q	1.992
20-49	15.220	4.344	6.261	4.169	7.325	1.941
50-99	13.828	4.318	6.313	3.991	7.480	2.018
100-249	11.501	4.272	6.164	3.511	5.488	2.008
250-499	11.787	4.407	5.432	3.173	4.416	2.058
500 and Over	13.219	4.249	6.069	3.426	5.215	2.388
All Manufacturing	13.916	4.329	6.181	3.721	5.279	2.144
Employment Size						
Under 50	17.906	4.524	6.532	4.391	Q	2.266
50-99	17.668	4.218	6.155	4.108	8.737	1.903
100-249	15.195	4.301	6.186	3.937	7.186	1.873
250-499	14.186	4.303	5.735	3.546	5.089	2.073
500-999	11.822	4.403	6.168	3.630	4.609	1.896
1,000 and Over	12.866	4.321	6.083	3.563	4.847	2.297
All Manufacturing	13.916	4.329	6.181	3.721	5.279	2.144

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.

Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 14. Shell Storage Capacity of Selected Petroleum Products by Industry Group and Selected Industries, 1985
(Thousand Liquid Barrels)

SIC Code[a]	Industry Group and Industry	Residual Fuel Oil	Distillate Fuel Oil	LPG
20	Food and Kindred Products	3,102	1,754	392
21	Tobacco Manufactures	217	51	2
22	Textile Mill Products	1,443	318	338
23	Apparel and Other Textile Products	45	167	13
24	Lumber and Wood Products	26	694	110
25	Furniture and Fixtures	91	152	76
26	Paper and Allied Products	5,339	1,063	122
2621	*Paper Mills, Except Building Power*	2,103	543	27
2631	*Paperboard Mills*	1,908	130	16
27	Printing and Publishing	51	203	47
28	Chemicals and Allied Products	4,840	2,260	W
2819	*Industrial Inorganic Chemicals*	489	365	44
2821	*Plastics Materials and Resins*	369	268	W
2869	*Industrial Organic Chemicals*	1,240	520	W
2873	*Nitrogenous Fertilizers*	74	284	12
29	Petroleum and Coal Products	1,731	Q	W
2911	*Petroleum Refining*	960	505	W
30	Rubber and Misc. Plastics Products	1,115	416	125
31	Leather and Leather Products	34	86	4
32	Stone, Clay and Glass Products	1,698	2,864	455
3241	*Cement, Hydraulic*	224	379	9
33	Primary Metal Industries	4,033	2,960	761
3312	*Blast Furnaces and Steel Mills*	3,306	1,391	78
3334	*Primary Aluminum*	W	121	63
34	Fabricated Metal Products	427	970	382
35	Machinery, Except Electrical	500	907	368
36	Electric and Electronic Equipment	428	757	249
37	Transportation Equipment	587	637	282
38	Instruments and Related Products	309	206	22
39	Misc. Manufacturing Industries	41	56	30
	Total	26,056	20,947	61,083

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table 15. Shell Storage Capacity of Selected Petroleum Products by Economic Characteristics of the Establishment, 1985
(Thousand Liquid Barrels)

Establishment Characteristics[a]	Residual Fuel Oil	Distillate Fuel Oil	LPG
Value of Shipments and Receipts (million dollars)			
Under 20	2,359	5,120	1,220
20-49	3,605	2,949	968
50-99	4,711	Q	1,091
100-249	6,806	3,117	1,223
250-499	4,016	1,440	2,946
500 and Over	4,560	2,164	53,634
Total	26,056	20,947	61,083
Employment Size			
Under 50	1,268	2,754	Q
50-99	846	Q	587
100-249	3,991	3,098	957
250-499	4,517	2,879	W
500-999	5,104	3,216	13,642
1,000 and Over	10,330	4,166	W
Total	26,056	20,947	61,083

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q=Withheld because relative standard error is greater than or equal to 50 percent. Data are included in higher level totals.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Appendix A

Survey Design, Implementation and Estimates

Appendix A

Survey Design, Implementation and Estimates

Introduction

The 1985 Manufacturing Energy Consumption Survey (MECS) has been designed by the Energy Information Administration (EIA) to provide information related to energy consumption in the manufacturing sector. The MECS data collection consisted of two parts. Part I collected data on energy consumption and related matters. The estimates from Part I of the survey are presented in Tables 1 through 15 of this report. Part II collected information on the capability of manufacturers to substitute alternate fuels for those actually consumed in 1985. The estimates from Part II are presented in a separate EIA report.[3]

The basic unit of data collection for this survey was the manufacturing establishment. A nationally representative sample of these establishments supplied the information through mailed questionnaires. The Industry Division of the Bureau of the Census selected the MECS sample according to EIA design specifications; conducted the fieldwork; and handled data processing, again with EIA input.

This appendix presents a summary of the design and implementation procedures for Part I of the survey, and describes the types of estimates included in this report. Complete details are available in a methodological report on the MECS published by EIA.[4]

Description of the Manufacturing Sector

The manufacturing sector consists of all manufacturing establishments in the 50 States and the District of Columbia. The working definition of a manufacturing establishment is the definition stated in the Office of Management and Budget's Standard Industrial Classification (SIC) Manual.[5]

A manufacturing establishment is an economic unit "...at a single physical location that is engaged in the mechanical or chemical transformation of materials or substances into new products. These establishments are usually described as plants, factories, or mills and characteristically use power driven machines and materials handling equipment. Establishments engaged in assembling component parts of manufactured products are also considered manufacturing if the new product is neither a structure nor other fixed improvement. Also included is the blending of materials such as lubricating oil, plastics, resins, or liquors."

The SIC Manual contains a hierarchial classification system that groups establishments according to their primary economic activities. This system divides the manufacturing sector into 20 major industrial groups that are relatively homogeneous with respect to primary output. Each of these major industrial groups is assigned a two-digit code. The two-digit codes for the manufacturing division range from SIC 20, Food and Kindred Products, through SIC 39, Miscellaneous Manufacturing Industries. Each major group is subdivided into three-digit groups which are further divided into four-digit industries. For example, SIC 20 includes SIC 201, Meat Products, which, in turn, is subdivided into SIC 2011, Meat Packing Plants; SIC 2012, Sausages and Other Prepared Meat Products; SIC 2016, Poultry Dressing Plants; and SIC 2017, Poultry and Egg Processing.

The SIC category is the single most important classification variable in the MECS data system, both for selecting the MECS sample and analyzing the MECS data. The categories of primary interest for the MECS are the 20 major industrial groups (SIC 20 through 39) and the 10 most energy-consumptive four-digit industries within these industry groups. A description of these 20 major industrial groups and 10 industries appears in Appendix D.

[3]Energy Information Administration, *Manufacturing Energy Consumption Survey: Fuel Switching Capabilities, 1985,* DOE/EIA-0515(85) (Washington, DC, 1988).

[4]Energy Information Administration, *Manufacturing Energy Consumption Survey: Methodological Report,* DOE/EIA-0514 (Washington, DC, 1988).

[5]Office of Management and Budget, *Standard Industrial Classification Manual, 1972* (Washington, DC, 1972), p. 57.

The Sampling Frame and Its Relationship to the Manufacturing Sector

As mentioned in the Introduction to this appendix, the Census Bureau serves as the collecting and compiling agent for the MECS. A major benefit of selecting the Census Bureau to provide this service was that the EIA was able to have access to an intact list of manufacturing establishments to serve as the frame for the MECS sample. Therefore, prior to discussing the MECS sample, the "frame" from which it was selected will be described in some detail.

A major responsibility of the Industry Division of the Census Bureau is to conduct the Census of Manufactures (CM) and the Annual Survey of Manufactures (ASM). The CM is conducted for years ending in "2" or "7" (for example, 1982), and obtains economic data for the complete universe of approximately 350,000 manufacturing establishments in the United States. For the purposes of data collection, the CM universe is divided into two major subsets as follows.

1. **Small Single-Establishment Companies Not Sent a Report Form.** These companies are excused from filing a CM report. Generally, those with less than 5 employees are excused while all with more than 20 are mailed report forms. Those with 5 through 20 employees are excused or sent a report form based on the magnitude of their annual payroll and shipments data. Approximately 125,000 establishments are excused due to this criterion.

2. **Establishments Sent a Report Form.** The remaining manufacturing establishments in the universe are sent a report form.

The ASM is conducted during non-CM years to provide estimates of economic characteristics for the universe of manufacturing establishments. The ASM contains two components. The mail portion is a probability sample of manufacturing establishments selected from the list of establishments that are sent the CM report form (see above). Those establishments are weighted so that they represent the mail portion of the CM universe. There are approximately 56,000 manufacturing establishments in the ASM mail sample. Prior to mailing the ASM materials, the sample is updated by adding new manufacturing establishments and removing those that went out of business or out of scope.

The second component of the ASM is the nonmail portion of the CM. These small establishments are not sent an ASM questionnaire, but their contribution is estimated based on selected information obtained annually from other Federal agencies.

The mail portion of the 1985 ASM, in turn, serves as the frame for the MECS sample. Thus, the universe covered by the MECS is the same universe covered by the ASM mail sample (that is, active CM establishments that are sent a report form, plus establishments that began operations since the last CM).

Sample Design

The overall desired size of the MECS sample was set at 12,000 establishments based upon available resources and preliminary estimates of expected and desired sampling error. The desired sample size was allocated among 30 industry-based strata consisting of the 10 most energy-consumptive four-digit SIC industries and the remaining portions of the 20 two-digit SIC industry groups. Due to random variability in the sample selection process, the actual sample contained 12,065 establishments. For the 10 most energy-consumptive industries, all 1,907 establishments in the 1984 ASM sample were included in the 1985 MECS sample with certainty. The remaining 10,158 establishments were sampled from the 20 two-digit groups in a pattern designed to keep sampling errors within pre-established bounds for estimates of total consumption and consumption of four major types of energy: electricity, natural gas, residual oil, and coal. The procedure for subselecting ASM sample establishments into the MECS sample were such that their overall probabilities of selection for the MECS were proportional to an estimated energy measure of size. The overall probabilities for selection of the MECS sample establishments ranged from 0.002 to 1.000.

The selection of the MECS sample is, therefore, a two-stage selection process, with the first stage being the selection of the ASM mail sample, and the second, being the subselection of the MECS sample from the ASM sample. Thus, a MECS sample establishment is selected conditional upon it having been selected into the ASM mail sample. Its probability of selection from the ASM sample is a conditional probability so that the *overall* probability of selection into the MECS sample is represented by the product of this conditional probability and its ASM selection probability.

Of the initial sample of 12,065 establishments, 381 were determined to be out of business or out of scope based on updating procedures used by the Census Bureau. Thus, a final sample of 11,684 establishments were mailed a questionnaire. Usable responses were received from 10,499, or 90 percent, of those establishments. However, those respondents represented 97 percent of the total unweighted value of shipments and receipts of the final sample.

Fieldwork, Editing, and Quality Control

Questionnaires were mailed to the in-scope MECS sample establishments on July 14, 1986. Returned questionnaires were subjected to initial screening procedures for completeness, and incomplete forms or responses with obvious inconsistencies were set aside for review by industry specialists. Valid returned questionnaires were forwarded directly to check-in and then to data entry.

All forms that were incomplete or failed the initial screening procedures were carefully reviewed by the industry specialists. The specialists retrieved missing data and verified questionable items by telephone contact with the individual who completed the questionnaire. Once the forms were completed and verified, they were forwarded to check-in and to data entry.

The resulting MECS data file was then subjected to a series of computer edits. These edits included consistency checks against data items from other parts of the MECS and the 1985 ASM, as well as checks for outliers in the distribution of individual variables. Records with failed edits were reviewed and followed up by industry specialists.

Development of the Data File

The estimates in this report were developed from a data file consisting of reported values and derived values.

Reported Values

Reported values consist of responses to the 1985 MECS questionnaire (see Appendix C). The single exception is the estimate of energy consumption for nonfuel purposes at petroleum refineries. The calculation of that quantity is discussed in the section of this appendix titled Consumption for Nonfuel Purposes at Refineries. For all remaining estimates, the responses to the questionnaire for each responding establishment were supplemented by the following economic data:

- Value of shipments and receipts
- Value added by manufacturing
- Total employment.

These economic data were not collected by the 1985 MECS, but were provided by the Census Bureau by linking the 1985 ASM economic data and MECS energy data at the establishment level.

Derived Values

The reported energy values were used to construct several derived values, which, in turn, were used to prepare the estimates appearing in selected tables in this report. (See Survey Estimates section in this appendix.) These derived values are defined as follows:

- Energy consumed onsite as a fuel and produced offsite--This derived value represents onsite consumption of fuels that were originally produced offsite. That is, they arrived at the establishment as the result of a purchase, or were transferred to the establishment from outside sources. As such, this derived value is approximately definitionally equivalent to "purchased" fuels as reported by the Census Bureau for the years 1974-1981.[6] The Census Bureau defines "purchased" fuels to include those actually purchased plus those transferred in from other establishments.
- Energy consumed onsite for nonfuel purposes and produced offsite--This derived value also represents energy that was originally produced offsite. This energy was used at the establishment site as raw material inputs and feedstocks.
- Energy consumed onsite as a fuel and produced onsite from nonenergy inputs--This derived value covers materials such as woodchips, bark, and woodwaste, and pulping liquor. These fuels are produced primarily in pulp and paper mills as a byproduct of wood used in the pulping process. Wood for pulping is not classified as energy in the MECS, and, therefore, would not have been included as an input. This derived value also covers waste materials, biomass, and hydrogen that was produced from the electrolysis of brine.
- Energy consumed onsite for nonfuel purposes and produced onsite from nonenergy inputs--Most onsite-produced energy that is used for nonfuel purposes is derived from other types of energy. The major exception is hydrogen that is produced from the electrolysis of brine. Hydrogen produced in this manner and used for nonfuel purposes is the only identified energy covered by this derived value.
- Energy consumed onsite as a fuel and produced onsite from energy inputs--This derived value covers a wide range of fuels consumed onsite that are produced onsite as direct products or byproducts of other types of energy.
- Energy consumed onsite for nonfuel purpose and produced onsite from energy inputs--This derived

[6]U.S. Department of Commerce, Bureau of the Census, *Annual Survey (Census) of Manufactures,* "Fuels and Electric Energy Consumed," 1974-1982 (Washington, DC).

value includes all petrochemical feedstocks and other raw material inputs that were produced onsite from existing energy or from other onsite-produced energy.

The first four of those derived values represent an addition to the energy consumed onsite, and are described in this publication as primary consumption (that is, either they were produced offsite or were produced onsite from nonenergy inputs). The fifth derived value described above does not represent an addition because it was produced onsite from energy that is already reported as input. Such energy thus represents duplicate counting of the input energy content. It is, however, a useful measure of onsite-produced fuel consumption and is nonduplicative with respect to an estimate of total fuel consumption. The sixth derived value is duplicative with respect to the consumption of energy for nonfuel purposes, and, therefore, was not used to prepare estimates. It was included only for computational purposes and completeness.

Assumptions Underlying Derived Values

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Is it necessary to say that excess is not put into inventory.

The Estimation Process

Estimates in this report represent the entire population of manufacturers in the CM universe that were covered in the 1985 ASM mailing. Full representation is accomplished by weighting the data from the establishment records in the consumption data file. Weighting is the process of multiplying the reported or derived values by a case-specific constant designed to inflate the data from each sample case to that portion of the population which it represents. The first, basic factor in the MECS weights was the sampling weight, which accounted for the MECS sampling process. The sampling weight for a MECS sample case was the reciprocal of its overall probability of selection, that is, its probability of selection into the ASM and subsequent selection for the MECS.

Prior to producing the estimates, the MECS sampling weights were adjusted to account for nonresponse and noncoverage. Noncoverage resulted from the exclusion of two groups of establishments from the frame. One group was those establishments that began operations in 1984 and continued through 1985. The other was establishments that ceased operations during 1985, but should have reported for the time that they were still in business.

Adjustment factors to account for nonresponse and noncoverage were calculated using the estimated 1984 consumption of purchased fuels and electricity. Basically, those factors are ratios of the estimated energy consumption of the population covered by the original MECS sample plus exclusions to the estimated energy consumption of the population covered by MECS respondents.

Because the nonresponding establishments and exclusions were not evenly distributed by SIC or by size of establishment (with respect to fuel consumption), a separate adjustment factor was calculated for large, medium, and small establishments within each of the 30 sampling strata. Within each of the 90 adjustment cells, the appropriate adjustment factor was then multiplied by the sampling weight for all responding MECS establishments. The product of the sampling weight and the adjustment factor is the final adjusted MECS weight, which is used to produce all MECS population estimates in this report. The adjustment factors, in effect, ratio adjust the weighted data from the MECS respondents to estimated totals for the universe that was initially targeted by the MECS frame and sample design, that is, manufacturers represented by the 1985 ASM mail sample.

Consumption for Nonfuel Purposes at Refineries

The basic function of a petroleum refinery (SIC 2911) is to manufacture a wide variety of petroleum products from crude oil and other liquid hydrocarbon inputs. Those products can be grouped into three classes. The largest class of products consist of fuels that are ultimately consumed strictly for their energy content. Many other refinery products, however, are consumed, not for their energy content, but for their chemical properties. This class of energy products is generally known as petrochemical feedstocks. Finally, a third class of products consists of finished materials that are consumed for specific uses not related to energy content or chemical properties. Those finished materials include asphalt, lubricants, waxes, and solvents, and are referred to as nonenergy products.

The MECS was specifically designed to collect information on the consumption of energy for heat, power,

and electricity generation, and as petrochemical feedstocks and other raw material inputs. The consumption of energy was reported directly by the establishments in the MECS sample, and the estimates in this report reflect that consumption. For most industries, the end result of energy inputs is manufactured products that are not considered energy products. However, fuels and petrochemical feedstocks produced from refinery inputs are treated as energy products by their subsequent users, and are reported not only in other manufacturing industries, but also in EIA surveys of consumption in other end-use sectors (residential households, residential vehicles, and commercial buildings). In that sense, refineries do not "use up" the majority of their inputs. They merely convert them from one form of energy (for example, crude oil) to another more usable form (for example, motor gasoline). Therefore, classifying refinery inputs that go into fuels and petrochemical feedstocks as refinery consumption would have resulted in massive double-counting of total energy consumption, both within the manufacturing sector, and across end-use sectors in the U.S. economy.

The third class of refinery products, nonenergy products, must be treated differently. The creation of those products by the refinery also requires energy inputs, primarily crude oil. The products are combustible and have a known heat content expressed in British thermal units (Btu). Asphalt, for example, contains 6.636 million Btu per 42-gallon barrel. However, the products are not recognized as energy by their subsequent consumers, and no provision was made for collecting data on their consumption from the MECS respondents. Therefore, the transformation of energy inputs to nonenergy products must be counted as refinery consumption, or it will never be accounted for anywhere in EIA's consumption surveys.

One characteristic of petroleum refineries is that, except for losses caused by spills, contamination, etc., the Btu content of the energy inputs exactly equals the Btu content of the outputs. Therefore, one only needs to know the quantities of those nonenergy products that were shipped by a refinery in order to estimate the quantity of energy inputs that was used to produce them. The Petroleum Supply Division of the EIA produces such information for all refinery products. The Monthly Refinery Report, Form EIA-810, collects information on the monthly shipments from the universe of refineries in the United States. These data were the basis for estimating the input energy requirements for the nonenergy products.

The shipment quantities of the nonenergy products, as reported on Form EIA-810, were converted to Btu and summed to produce a monthly refinery total. Those totals were then summed across refineries and months to produce the total Btu value of refinery shipments of nonenergy products for 1985. That total was used to represent the total Btu value of the inputs used to produce the nonenergy products, and was inserted directly into the appropriate tables of this report to represent nonfuel consumption in refineries (see Survey Estimates in this appendix). Because the individual energy inputs corresponding to these shipments were not identified, the Btu value was entered in the "other" column.

Survey Estimates

Except for the estimates of energy consumption for nonfuel purposes at petroleum refineries, all energy consumption and energy-related statistics produced from MECS data are calculated by combining the data collected from the sampled establishments with the adjusted sampling weights. These weights establish the relationship between the responding establishments and the manufacturing sector as defined for the MECS. Two types of statistics are shown in this report: aggregates (for example, total natural gas consumption in the hydraulic cement industry), and ratios (for example, the amount of fuel consumed per dollar of value added in the manufacturing sector). These statistics are based on the originally reported values or the derived values and appear in Tables 1 through 15.

Tables 1 and 2 present estimates of the total primary consumption of energy for all purposes by the manufacturing sector. These tables are based upon aggregates of the derived values of energy produced offsite, and those produced onsite from nonenergy inputs for consumption as a fuel and for nonfuel purposes. They also include estimates of net electricity and steam consumption, that is, purchases plus transfers in and generation from noncombustible renewable resources, minus quantities sold and transferred out. The resulting net electricity and steam values represent primary consumption. Primary consumption excludes quantities of energy that were produced from other energy inputs and, therefore, avoids double-counting.

As noted earlier, the only quantities of energy that are "used up" at a refinery are those consumed for the production of heat, power, and electricity, and the inputs for the production of nonenergy products. Moreover, those quantities consumed for heat and power and as inputs represent primary consumption, because they were produced offsite (for example, natural gas, distillate fuel oil), or were produced onsite from crude oil and other liquid hydrocarbons that originally were produced offsite. Because of this, the derived values described above were not appropriate for the petroleum refinery industry.

The estimates shown in the petroleum refinery row of Table 1 are conceptually different from the estimates in the other rows of that table. For all industries except petroleum refineries, each cell represents the total primary consumption of energy for *all* purposes. In the petroleum refinery row, the cell entries for "net elec-

tricity" through "coke and breeze" represent *only* the quantities of given type of energy that was consumed as a fuel. The "other" cell of the petroleum refinery row includes other energy that was consumed as a fuel *plus* the quantity of energy (mostly crude oil) that was consumed for the production of nonenergy products.

Table 2 shows primary consumption for all purposes by economic characteristics of the establishment. For that table, the row entitled "not ascertainable" includes, in the "other" column, the total quantity of energy consumed for the production of nonenergy products by refineries. The quantities of energy consumed for the production of heat and power in refineries are included throughout the remainder of the table, depending on the value of shipments or employment size of the responding establishment.

Except for petroleum refineries (see Consumption for Nonfuel Purposes at Refineries in this appendix), the estimates in Tables 1 and 2 are based on the following derived values:

- Energy consumed onsite as a fuel and produced offsite
- Energy consumed onsite for nonfuel purposes and produced offsite
- Energy consumed onsite as a fuel and produced onsite from nonenergy inputs
- Energy consumed onsite for nonfuel purposes and produced onsite from nonenergy inputs.

Tables 3 and 4 present estimates of input energy for the production of heat and power, and the generation of electricity. For combustible energy, the estimates are based upon the originally reported MECS questionnaire responses to "Quantity consumed onsite in 1985 as a fuel" (see Appendix C). That reported value is exactly equal to the sum of the following derived values:

- Energy consumed onsite as a fuel and produced offsite
- Energy consumed onsite as a fuel and produced onsite from nonenergy inputs
- Energy consumed onsite as a fuel and produced onsite from energy products.

Thus, the estimates of combustible energy in Tables 3 and 4 represent total consumption as a fuel, regardless of where the energy was produced.

It should be noted that the consumption estimates for combustible energy are not duplicative with respect to fuel use. There is obviously no duplication for quantities that were produced offiste as well as those produced onsite from nonenergy inputs. The situation is not as clear for quantities produced onsite from other energy inputs, however. Those quantities result from the consumption of an energy as a feedstock or raw material input. They do not result from the consumption of an energy as a fuel.

Examples of energy produced onsite from other energy inputs include,

- Coke oven gas produced as a byproduct of the distructive distillation of coal to produce coke
- Petroleum coke produced in refineries as a result of the high temperature treatment of petroleum fractions
- Still gas produced in refineries as a result of distillation, cracking, reforming, and other processes.

From those examples, it is clear that the input energy was not consumed as a fuel and would not have been included elsewhere in Tables 3 and 4.

The estimates of electricity and steam (note that steam is included in the "other" energy category) must conform to the same criteria as combustible energy. That is, they must represent inputs to produce heat and power, and to generate electricity that do not duplicate energy content represented elsewhere in Tables 3 and 4.

In the case of electricity, the quantities generated onsite by conventional generation or cogeneration must be excluded because the input fuels to produce the electricity (coal, for example) are already counted elsewhere in the table. Thus, the nonduplicative measure of electricity input for Tables 3 and 4 is the same net electricity estimate that appeared in Tables 1 and 2. The same rationale applies to steam. Onsite production is excluded because the input fuel would be counted elsewhere. Thus, the allocation of energy to the various sources shown in Tables 3 and 4 is consistent with a concept of "first use" of energy for heat, power, and electricity generation.

Tables 5 and 6 present the total primary consumption of combustible energy for nonfuel purposes. These tables are based upon aggregates of the derived values of energy produced offsite plus those produced onsite from nonenergy inputs, and consumed onsite for nonfuel purposes. Tables 5 and 6 present the nonfuel primary consumption component of Tables 1 and 2. The entry in the "other" column of the petroleum refinery row of Table 5 represents the total inputs (mostly crude oil) for the production of nonenergy products. The other cells in the petroleum refinery row contain a zero entry because the table represents consumption for nonfuel purposes only, and the refinery inputs are available in aggregate form only.

Except for petroleum refineries (see Consumption for Nonfuel Purposes at Refineries in this appendix), the estimates in Tables 5 and 6 are based on the following derived values:

- Energy consumed onsite for nonfuel purposes and produced offsite

- Energy consumed onsite for nonfuel purposes and produced onsite from nonenergy inputs.

Tables 7 and 8 present the total consumption as a fuel of offsite-produced energy. As noted, these estimates are approximately definitionally equivalent to the Census Bureau's "purchased" fuels.

The estimates in Tables 7 and 8 are based on the following derived value:

- Energy consumed onsite as a fuel and produced offsite.

Table 9 presents electricity cogeneration. Cogeneration is defined as the production of electrical energy and another form of useful energy (such as steam) through the sequential use of energy. This table is based upon responses to the question, "During 1985, how much electricity was generated onsite from cogeneration?" (See Appendix C.) Other electricity estimates are "net electricity" in Tables 1 through 4, and "purchased electricity" in Tables 7 and 8.

Tables 10 and 11 present estimates of several energy-related operating ratios. These estimates are computed from energy data reported by the MECS responding establishments and economic data reported on the ASM for the same establishments. The consumption values used in the formation of these ratios are the total consumption values for heat and power appearing in Tables 3 and 4. It is not possible to exactly reconstruct the 1985 ASM estimates of economic variables by dividing MECS consumption by corresponding ratios of consumption per economic unit. ASM estimates are produced from the ASM sample and weighting scheme, plus the nonmail adjustment, and, thus, represent the entire manufacturing sector. The MECS, on the other hand, does not represent the very small establishments in the manufacturing sector.

Tables 12 and 13 present the average prices paid for purchased energy. These prices were calculated directly from responses to the MECS questionnaire entries regarding quantity of energy purchased, and total expenditures for that energy (see Appendix C).

Tables 14 and 15 present total shell storage capacity of residual oil, distillate oil and LPG. Shell storage capacity includes all onsite capacity, including that which is dedicated or leased for storage of energy owned by other establishments.

The Heat Content of Energy

Most of the estimates of individual energy in this report are presented in physical units (kilowatthours, barrels, short tons). Row totals and combinations of types of energy are presented in British thermal units (Btu). Table 1 is presented in physical units and Btu in Parts 1 and 2, respectively.

A Btu is the quantity of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit. Thus, converting physical units of a given type of energy to Btu is a means of expressing the heat content of that energy. All Btu quantities are in terms of higher heating value, with no regard for efficiency of use. Because no energy consumption process is 100 percent efficient (although some are considerably more energy efficient than others), Btu figures must be considered as the maximum available heat content. The following table presents the Btu conversion factors of major types of energy.

Conversion of Physical Units to British Thermal Units

Type of Energy	British Thermal Units (thousands)
Electric Energy (1,000 kilowatthours)	3,412
Residual Fuel Oil (42 gallon barrel)	6,287
Distillate Fuel Oil (42 gallon barrel)	5,825
Natural Gas (1,000 cubic feet)	1,032
LPG (42 gallon barrel)	3,603
Coke and Breeze (short ton)	24,800
Coal Used as Fuel (short ton)	22,012
Coal Used for Coking (short ton)	26,800

Source: Energy Information Administration, *Monthly Energy Review*, (January 1987), pp. 119-121.

Appendix B

Quality of the Data

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Quality of the Data

Introduction

All data collection activities and the estimates produced from them are subject to a variety of errors. These errors may be broadly classified under two general types, sampling error and nonsampling error.

Sampling error is defined as the variability in a survey estimator that arises because data are collected from a sample of units rather than the entire population. Each possible sample produces different estimates of population parameters, depending on the set of respondents that are selected. Nonsampling errors, on the other hand, occur in any data collection activity, whether a sample survey or a complete census. Nonsampling errors are attributable to all aspects of the total survey design other than the sampling process, and can include both random and systematic (biasing) errors. Commonly recognized sources of nonsampling error include undercoverage, random and systematic response errors, nonresponse, data processing errors, and tabulation errors. This appendix describes the effect of both sampling and nonsampling errors on data from the MECS. More details are presented in the methodological report for the MECS.[7]

Sampling Error

The estimated values appearing in this report were developed from a sample of manufacturing establishments and, as a result, will differ from true population values that would be obtained from a complete census. This is because the MECS sample is only one of a very large number of samples that could have been selected under the same sampling specifications. Each possible sample would yield its own estimates of the true population values, with the differences attributable to the particular set of establishments selected into each sample.

One measure of variability due to sampling is the average difference between the estimates that would be produced by all possible samples and the mean value of these estimates. This type of measure is commonly known as sampling error. Estimates of the magnitude of these sampling errors based on data from a single sample are provided by a statistic known as the standard error of an estimate. Standard errors for MECS estimates are computed from the reported data using the formula:

$$S_{\hat{Y}} = \sqrt{\sum_{i=1}^{n} y_i^2 (W_i)(W_i - 1)} \,. \qquad (1)$$

where $\hat{Y} = \Sigma y_i \cdot W_i$ is the MECS survey estimator, y_i is the reported value of characteristic Y for the i^{th} MECS sample case, W_i is the final adjusted weight used to inflate the sample data to population estimates, and n is the number of MECS respondents. Justification for this formula is found in the MECS methodological report.

Estimates of standard errors have been computed from the MECS sample data for the estimated aggregate values and ratios appearing in this report. They are presented in the form of relative standard errors (RSE), that is, the standard error divided by the estimated value to which it refers. The RSE's are given in Tables B1 through B15 of this appendix.

The estimates in this report can be used to produce proportion statistics based on the ratio of various estimates reported in Tables 1 through 15. Proportions are not given in the detailed tables but can be used to clarify the analysis. A proportion is the statistic of the form

$$\hat{P} = \frac{\hat{Y}}{\hat{X}} \,, \qquad (2)$$

where $\hat{Y}$ and $\hat{X}$ are survey-based estimates of aggregate parameters Y and X, respectively, and characteristic X "encompasses" characteristic Y. That is, each population element (and, thus, each sample case) that contrib-

[7]Energy Information Administration, *Manufacturing Energy Consumption Survey: Methodological Report,* DOE/EIA-0514 (Washington, DC, 1988).

utes to Y also contributes to X, and the value of X for each element is greater than or equal to the value of Y.

The RSE's of aggregate statistics shown in Tables B1 through B15 can be used to produce approximate errors for proportions. The straightforward additive error formula shown in (1) gives rise to a similarly straightforward upper bound approximation to the error of an estimated proportion. The approximation can be expressed in terms of relative error as

$$RSE(\hat{P}) \leqq \sqrt{[RSE(\hat{Y})]^2 \cdot (1 - 2\hat{P}) + [RSE(\hat{X})]^2} \quad . (3)$$

Justification for this formula is found in the MECS methodological reort.

Basically, these RSE's can be used to evaluate how precisely a given sample statistic estimates the corresponding population parameter. The larger the RSE, the less precise the estimate. For example, an estimated total of 13.62 quadrillion Btu of energy was consumed for heat, power, and generated electricity by the MECS target population in 1985 (Table 3) and this estimate has an RSE of 2 percent (Table B3). Similarly, the consumption of energy for heat, power, and generated electricity in the Northeast Census Region was 1.68 quadrillion Btu with an associated RSE of 3 percent. The estimate of energy consumption in the Northeast Census Region is relatively less precise than the estimate for the entire United States, primarily because, all other things being equal, larger samples result in smaller RSE's. Naturally, the MECS sample for the entire United States is larger than the sample for the Northeast Census Region.

Confidence intervals can also be developed from an estimate and its associated RSE using the central limit theorem to claim normal distribution properties for the MECS estimator. A confidence interval is a range of values which, due to its method of construction, has a known probability of containing the true, but unknown population parameter with repeated sampling. Confidence intervals are formed by adding and subtracting multiples of the standard error from the estimate, and are an alternative method of expressing precision.

Again, for the example of 13.62 quadrillion Btu of energy consumption for heat, power, and generated electricity and its associated RSE of 2 percent, the standard error is approximately 0.27 quadrillion Btu (2 percent of 13.62 quadrillion Btu). The estimated value plus and minus one standard error will provide a range that includes the true population parameter for about 68 percent of all samples. The 68 percent confidence interval for energy consumption for heat and power is 13.62 quadrillion Btu ± 0.27, or 13.35 to 13.89 quadrillion Btu. The estimated value plus and minus two standard errors includes the true population parameter for about 95 percent of all samples. The 95 percent confidence interval is 13.08 to 14.16 quadrillion Btu. Finally, a confidence interval formed by the estimated value plus and minus three standard errors provides more than 99 percent confidence that the range contains the true population parameter. The 99 percent confidence interval for estimated energy consumption for heat and power is 12.80 to 14.44 quadrillion Btu.

Standard errors may also be used to compare two or more survey estimates. For example, nationally, the Paper and Allied Products industries (SIC 26) consumed 387 billion cubic feet of natural gas for heat, power, and generated electricity in 1985, and the Stone, Clay, and Glass Industry (SIC 32) consumed 372 billion cubic feet (Table 3). The relative standard errors (Table B3) for these estimates are 4 and 3 percent, respectively.

From a comparison of these two estimates, one might conclude that SIC 26 consumed slightly more natural gas than did SIC 32. This may not be a valid conclusion, however, because the difference between the two estimates may be due to sampling variability rather than to a difference in the true population values. Such comparisons, therefore, are subject to statistical testing.

The appropriate statistical test is the standard normal deviate test. By appeal to the central limit theorem, this test assumes that a sampling distribution of the differences between two estimates is normal. The test is most appropriate when the distributions of the two estimates in question are independent. Therefore it can be used to test for difference between industrial strata, geographic regions, etc.[8] The test statistic is given as:

$$Z_{\hat{X}-\hat{Y}} = \frac{\hat{X} - \hat{Y}}{\sqrt{S^2_{\hat{X}} + S^2_{\hat{Y}}}} \quad . \quad (4)$$

where $\hat{X}$ and $\hat{Y}$ are the survey estimates of the population values X and Y, respectively, and $S_{\hat{X}}$ and $S_{\hat{Y}}$ are the estimated standard errors. The test statistic, $Z_{\hat{X}-\hat{Y}}$, is then compared to a predetermined critical value, Z_C, and if the value of the test statistic exceeds the critical value, the hypothesis of no difference is rejected in favor of the alternative. If, on the other hand, the test statistic is equal to or less than the the critical value, the null hypothesis is not rejected, and it is concluded that the evidence provided by the sample data does not support the alternative hypothesis.

[8]For a more complete discussion of the central limit theorem and the standard normal deviate test, the reader is referred to any introductory statistics textbook.

Ordinarily, the critical value, Z_C, is set so that the level of significance of the test is .05 (that is, the probability of incorrectly detecting a significant difference is .05). Two values correspond to this level of significance -- 1.96 and 1.65. The former is the appropriate value when the test is nondirectional, that is, when the relevant question is, "Is there any difference in the two population values?" In this case, the absolute value of the test statistic $Z_{\hat{X}-\hat{Y}}$ would be compared to 1.96.

The value of 1.65 is appropriate when the test is directional, that is, when the relevant question is, "Is one population value greater than than the other?" In this case, the true value of the test statistic would be compared to 1.65.

Returning to the previous example, the standard errors for the estimates of natural gas consumption in SIC 26 and SIC 32 are 15 trillion Btu (4 percent of 387) and 11 trillion Btu (3 percent of 372), respectively. The test is directional because the relevant question is, "Is the consumption of natural gas in SIC 26 greater than the consumption of natural gas in SIC 32?", and the relevant critical value is 1.65. The test statistic is computed as:

$$Z_{\hat{X}-\hat{Y}} = \frac{387 - 372}{\sqrt{15^2 + 11^2}} = \frac{15}{18.6} = 0.8. \quad (5)$$

Because the value of $Z_{\hat{X}-\hat{Y}}$ does not exceed the critical value of 1.65, it must be concluded that there is insufficient sample evidence to reject the null hypothesis, and that there is no difference between the true population values. Based upon the results of this test, the sample estimates do not support the conclusion that SIC 26 consumed slightly more natural gas than did SIC 32, and a statement such as that should be avoided.

Finally, situations may arise in which it is desirable to compare more than two estimates. For example, one might wish to state, "The four Census regions in decreasing order of total energy consumption (Table 1, Part 1) are: the South with 9,048 trillion Btu, the Midwest with 4,171 trillion Btu, the West with 2,247 trillion Btu, and the Northwest with 2,056 trillion Btu." Before such a statement can be made, it is necessary to determine whether all possible pairs of estimates are significantly different in the stated direction. The number of possible comparisons among the four Census regions is given as the combinatorial ${}_4C_2 = 6$. Conducting each test at a .05 level of significance results in a probability of incorrectly detecting at least one significant difference, when none in fact exist, of $1 - (1 - .05)^6 = 0.26$. This overall probability can be kept within .05 by conducting each test at $.05/6 = .0083$ level of significance, which has a corresponding critical value of 2.40 for a directional test. The following table lists the appropriate critical values for up to 10 directional and nondirectional multiple hypothesis tests. These critical values result in an overall level of significance of .05.

Suggested Critical Values for Multiple Hypothesis Test

Number of Comparisons	Directional Tests	Nondirectional Tests
1	1.65	1.96
2	1.96	2.24
3	2.13	2.39
4	2.24	2.50
5	2.33	2.58
6	2.39	2.64
7	2.45	2.70
8	2.50	2.74
9	2.54	2.77
10	2.58	2.81

Nonsampling Errors and Bias

Nonsampling errors that affect MECS survey data can be divided into four major categories:

1. **Operational errors**, including editing, coding, and tabulation errors.
2. **Errors of measurement**, including a lack of precision by the respondent, failure of the respondent to understand instructions, etc..
3. **Errors of estimation**, including the assumptions underlying the derived values.
4. **Errors of nonobservation**, including nonresponse and noncoverage.

These errors are collectively referred to as nonsampling errors because they are not related to the sampling process, and thus would be equally likely to occur in a complete census or a sample survey.

It is felt that operational errors are not a major concern for the estimates included in this report. The quality control procedures that were employed for check-in, editing, coding and keying the returned questionnaires (see Appendix A) are standard procedures that are in place at the Bureau of the Census and have withstood the test of time. Data tabulations were verified by comparing marginal totals in tables generated from files supplied to EIA with corresponding totals generated directly from microdata files held at the Census Bureau.

Errors of measurement are a concern in any data collection activity. The survey results for the MECS were

subjected to extensive editing procedures which were specifically designed to detect errors of measurement. Responses that failed these tests for reasonableness and consistency were recalled by analysts familiar with manufacturing processes and energy use. Major errors, including omissions and misreporting by orders of magnitude, were corrected. No editing procedure is capable of identifying all measurement errors, however, and some small errors will remain. To the extent that these errors are due to random, rather than systematic misjudgments, they are compensating in the aggregate totals presented in this report, and it is believed that there are few large systematic biases that result from them.

Errors of estimation could have resulted from the assumptions that underlie the derived values (see Appendix A), and the estimates of the consumption of onsite- and offsite-produced fuels and raw material inputs could be biased as a result of such errors. For example, the assumption that energy produced onsite is consumed as an input or feedstock before any is consumed as a fuel could result in consistently underestimating the consumption of "over the fence" feedstocks and overestimating the consumption of "over the fence" fuels. These nonsampling errors, if present, are relevant only for tables in this report that are based on derived values. Estimates based upon reported values would not be subject to this potential source of bias.

Finally, several potential sources of nonsampling error and bias result from errors of nonobservation. One source of noncoverage error results from the MECS target universe not being identical to the total manufacturing universe. As previously described, the population of interest for the MECS is the same universe covered by the ASM mail sample (Appendix A). That target universe excludes very small establishments, and thus, noncoverage represents a source of bias with respect to estimated energy consumption by the universe of manufacturing establishments. The effect of this noncoverage is generally not large (estimated only to be a few percent for most industry groups) because energy consumption is highly concentrated among the larger manufacturing establishments, and the MECS sample was specifically designed to capture those establishments with substantial energy consumption. Nevertheless, users should be aware of this noncoverage bias when attempting to relate the MECS estimates to the universe of all manufacturing establishments.

In addition, Appendix A describes the adjustments that were made to the MECS sampling weights to account for nonresponse and noncoverage of specific portions of the MECS target universe. Basically, the procedure was to ratio adjust the weighted data from the MECS respondents to the estimated totals for the universe that was initially targeted by the MECS frame and sample design. Clearly, had these adjustments not been performed, the estimates produced from only the responding establishments would not have been representative of the target universe for the MECS. Such estimates would potentially have been biased. Adjusting the sampling weights to reflect the target universe is an attempt to mitigate the potential effects of such a bias.

As described in Appendix A, separate adjustment factors were developed by size of establishment within sampling strata, resulting in 90 separate adjustment factors. Adjustment factors were calculated for each of the 90 cells using estimated 1984 fuel consumption for heat and power. Each cell represents a relatively homogeneous subgrouping of establishments with respect to primary output and level of fuel consumption. Implicit in that procedure is the assumption that primary output and level of fuel consumption are highly correlated with energy consumption patterns, so that the establishments within a cell would also be homogeneous with respect to the quantities, types, and shares of energy consumed as fuels and for nonfuel purposes.

To the extent that the nonresponding establishments within the adjustment cells share the energy consumption patterns of the responding establishments within those cells, the resulting adjustments to the MECS estimates will tend to be minimally biased. If, on the other hand, the energy consumption patterns of the responding and nonresponding establishments differ substantially, the resulting adjustments are potentially biased, and may not represent the originally targeted MECS universe.

More detailed information on sources of nonsampling error in the MECS can be found in the methodological report.

Comparison with Other Data Sources

It is difficult to compare the results of the MECS with the results of other data collection efforts because of definitional and coverage differences. Table B16 presents the MECS estimates of total 1985 consumption of energy in manufacturing, along with consumption values produced from other EIA survey systems and published in other report series. The other survey data are presented as they are published, that is, in physical units or Btu, while the MECS data are shown on both scales for purposes of comparison.

MECS values are slightly to substantially lower than the other values, due primarily to differences in population coverage, as explained in the endnotes of Table B16. All of the non-MECS values cover the "industrial" sector, which is commonly defined to consist of manufacturing, mining, construction, and agriculture (industries classified in SIC categories 01-39). However,

there is some variability in the actual definitions, as explained in the endnotes.

In addition, the only non-MECS estimates that are based on a survey of consumers are the coal statistics. All others are based on delivery data from the account records of energy suppliers. The sectoral designation of an account is sometimes based on the rate class to which a customer is assigned by the supplier rather than on the activities in which the customer is engaged. Therefore, it is likely that some industrial facilities are counted as nonindustrial energy use, and vice versa. The magnitude and direction of the effect of this sectoral crossover is impossible to determine.

Even with the differences just mentioned, it is interesting to note that manufacturing (and, thus, the MECS estimates) accounts for a large proportion of total industrial energy use, except for petroleum products. The fact that only residual oil, distillate oil, and LPG are included in the MECS estimate has relatively little effect on the comparison, because other petroleum products are minor contributors to consumption in manufacturing (so minor that they are grouped in the "other" category for MECS publications). The majority of petroleum use in the industrial sector takes place in agriculture, mining, and construction.

After differences of coverage and sectoral definitions are taken into account, no obvious measurement differences remain that cannot be explained by the sampling variability inherent in the MECS. It is likely that some estimation biases will occur for scattered small population subgroups and certain specialized energy measures. In fact, a few rows of estimates in the data tables of this report have been withheld in favor of the symbol "NA" due to Census Bureau analysis that indicated subgroups for which such biases were likely. However, national-level estimates for comprehensive energy use measures appear to have no major problems.

Table B1. Relative Standard Errors for Table 1, Parts 1 and 2 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke and Breeze	Other
					Total United States					
20	Food and Kindred Products	5	4	7	21	3	27	5	9	31
21	Tobacco Manufactures	6	6	7	29	11	14	8	0	*
22	Textile Mill Products	3	3	7	24	4	11	7	0	9
23	Apparel and Other Textile Products	7	8	29	17	12	31	21	0	*
24	Lumber and Wood Products	11	8	W	20	8	W	W	0	16
25	Furniture and Fixtures	7	7	20	20	8	21	15	0	20
26	Paper and Allied Products	3	3	4	9	4	6	5	0	4
2621	*Paper Mills, Except Building Paper*	3	4	5	9	4	8	5	0	4
2631	*Paperboard Mills*	7	8	10	10	9	10	10	0	8
27	Printing and Publishing	6	7	15	21	7	28	39	0	16
28	Chemicals and Allied Products	2	6	7	16	2	6	3	18	10
2819	*Industrial Inorganic Chemicals*	9	18	11	14	9	11	15	18	28
2821	*Plastics Materials and Resins*	5	3	4	15	6	6	5	0	37
2869	*Industrial Organic Chemicals*	4	3	7	31	3	10	4	0	10
2873	*Nitrogenous Fertilizers*	4	8	W	5	3	W	0	0	W
29	Petroleum and Coal Products	2	3	8	18	4	8	9	0	2
2911	*Petroleum Refining*	2	3	7	12	5	7	9	0	2
30	Rubber and Misc. Plastics Products	3	5	7	12	4	13	7	0	17
31	Leather and Leather Products	12	19	13	41	15	40	33	0	*
32	Stone, Clay and Glass Products	3	3	13	20	3	16	5	47	17
3241	*Cement, Hydraulic*	5	4	26	6	8	11	5	W	W
33	Primary Metal Industries	3	4	7	7	3	13	5	6	8
3312	*Blast Furnaces and Steel Mills*	4	3	8	5	4	8	5	7	11
3334	*Primary Aluminum*	8	8	W	12	8	26	16	W	11
34	Fabricated Metal Products	4	5	12	13	5	13	6	17	13
35	Machinery, Except Electrical	4	4	14	12	5	15	5	32	14
36	Electric and Electronic Equipment	3	4	8	12	3	13	5	8	12
37	Transportation Equipment	2	3	5	7	3	16	4	13	8
38	Instruments and Related Products	6	9	W	23	9	Q	W	0	38
39	Misc. Manufacturing Industries	8	7	17	17	9	29	17	0	Q
	Total	1	2	3	6	1	5	3	6	3
					Northeast Census Region					
20	Food and Kindred Products	8	8	11	18	8	29	15	0	49
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	9	12	12	24	12	19	22	0	19
23	Apparel and Other Textile Products	16	16	40	21	38	Q	0	0	*
24	Lumber and Wood Products	39	26	Q	Q	27	Q	0	0	Q
25	Furniture and Fixtures	20	17	41	29	24	Q	Q	0	Q
26	Paper and Allied Products	5	5	6	17	14	9	9	0	7
2621	*Paper Mills, Except Building Paper*	6	6	7	16	W	11	W	0	8
2631	*Paperboard Mills*	14	14	22	Q	18	33	45	0	*
27	Printing and Publishing	12	13	Q	25	14	Q	Q	0	25
28	Chemicals and Allied Products	15	10	8	22	8	Q	7	0	15
2819	*Industrial Inorganic Chemicals*	13	17	20	28	13	22	36	0	*
2821	*Plastics Materials and Resins*	6	11	5	W	W	W	W	0	W
2869	*Industrial Organic Chemicals*	Q	6	17	47	3	Q	0	0	6
2873	*Nitrogenous Fertilizers*	W	W	W	*	*	*	0	0	*
29	Petroleum and Coal Products	6	11	13	34	13	W	W	0	4
2911	*Petroleum Refining*	4	11	W	W	W	W	W	0	4
30	Rubber and Misc. Plastics Products	8	12	11	20	9	24	0	0	39
31	Leather and Leather Products	11	13	15	28	16	43	36	0	Q
32	Stone, Clay and Glass Products	6	6	15	21	7	W	8	W	18
3241	*Cement, Hydraulic*	8	8	Q	10	Q	*	8	0	24
33	Primary Metal Industries	7	8	W	W	5	28	11	16	15
3312	*Blast Furnaces and Steel Mills*	9	6	12	7	6	12	12	14	16
3334	*Primary Aluminum*	W	W	W	W	W	*	W	0	W
34	Fabricated Metal Products	9	12	15	17	11	33	31	33	40
35	Machinery, Except Electrical	8	9	15	20	11	31	22	Q	17
36	Electric and Electronic Equipment	7	10	9	16	8	17	W	W	W
37	Transportation Equipment	5	7	5	9	7	W	W	0	15
38	Instruments and Related Products	6	14	9	W	14	*	W	0	*
39	Misc. Manufacturing Industries	15	12	18	19	14	14	W	0	Q
	Total	3	3	4	8	3	Q	8	14	4

See footnotes at end of table.

Table B1. Relative Standard Errors for Table 1, Parts 1 and 2 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke and Breeze	Other
					Midwest Census Region					
20	Food and Kindred Products	4	5	12	38	5	Q	6	13	21
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	15	15	38	42	17	Q	40	0	*
24	Lumber and Wood Products	19	20	W	45	19	W	W	0	35
25	Furniture and Fixtures	11	11	18	Q	11	22	W	0	27
26	Paper and Allied Products	6	5	10	33	9	15	11	0	9
2621	*Paper Mills, Except Building Paper*	6	6	10	15	6	7	7	0	9
2631	*Paperboard Mills*	13	12	30	19	13	14	15	0	25
27	Printing and Publishing	9	10	W	Q	W	23	40	0	27
28	Chemicals and Allied Products	8	18	14	Q	3	18	4	0	39
2819	*Industrial Inorganic Chemicals*	25	34	36	19	11	*	21	0	20
2821	*Plastics Materials and Resins*	8	6	9	8	7	W	W	0	9
2869	*Industrial Organic Chemicals*	5	4	W	W	7	W	6	0	6
2873	*Nitrogenous Fertilizers*	4	4	0	7	4	*	0	0	*
29	Petroleum and Coal Products	4	6	12	28	W	W	24	0	5
2911	*Petroleum Refining*	4	7	W	W	8	10	W	0	5
30	Rubber and Misc. Plastics Products	5	7	10	25	7	16	8	0	29
31	Leather and Leather Products	27	47	W	Q	15	*	41	0	*
32	Stone, Clay and Glass Products	5	5	18	43	5	15	9	30	24
3241	*Cement, Hydraulic*	8	8	19	8	17	*	8	W	W
33	Primary Metal Industries	5	6	8	6	4	19	7	7	12
3312	*Blast Furnaces and Steel Mills*	6	5	W	W	6	8	W	8	W
3334	*Primary Aluminum*	W	W	0	W	W	31	W	W	27
34	Fabricated Metal Products	5	5	22	W	5	21	6	W	13
35	Machinery, Except Electrical	5	6	40	10	7	23	5	35	23
36	Electric and Electronic Equipment	4	6	9	37	5	25	6	W	W
37	Transportation Equipment	3	3	9	11	4	24	4	15	12
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	12	12	Q	45	14	*	W	0	W
	Total	2	4	7	14	2	15	4	7	5
					South Census Region					
20	Food and Kindred Products	12	7	17	48	5	19	13	24	49
21	Tobacco Manufactures	6	6	7	29	11	15	8	0	*
22	Textile Mill Products	3	4	8	36	4	14	7	0	10
23	Apparel and Other Textile Products	10	10	Q	28	15	32	24	0	*
24	Lumber and Wood Products	15	10	31	35	12	34	0	0	18
25	Furniture and Fixtures	11	11	25	28	14	31	18	0	25
26	Paper and Allied Products	5	5	7	10	6	13	7	0	5
2621	*Paper Mills, Except Building Paper*	5	6	11	13	6	10	7	0	6
2631	*Paperboard Mills*	8	9	13	11	11	12	12	0	9
27	Printing and Publishing	11	13	14	38	14	30	0	0	34
28	Chemicals and Allied Products	2	4	10	5	2	3	3	22	10
2819	*Industrial Inorganic Chemicals*	9	16	14	15	12	16	20	22	Q
2821	*Plastics Materials and Resins*	7	4	9	20	7	6	6	0	40
2869	*Industrial Organic Chemicals*	3	4	7	4	3	4	5	0	12
2873	*Nitrogenous Fertilizers*	W	W	W	6	4	W	0	0	*
29	Petroleum and Coal Products	3	5	30	45	5	W	W	0	3
2911	*Petroleum Refining*	3	5	W	16	6	W	W	0	3
30	Rubber and Misc. Plastics Products	5	6	8	19	6	11	12	0	14
31	Leather and Leather Products	29	15	W	Q	40	Q	Q	0	*
32	Stone, Clay and Glass Products	5	5	18	35	5	W	9	Q	31
3241	*Cement, Hydraulic*	9	8	14	13	12	*	10	W	W
33	Primary Metal Industries	5	7	16	11	5	11	8	13	17
3312	*Blast Furnaces and Steel Mills*	7	6	17	6	7	13	9	16	13
3334	*Primary Aluminum*	12	13	0	18	12	16	22	W	W
34	Fabricated Metal Products	8	10	15	W	9	23	9	W	18
35	Machinery, Except Electrical	7	8	20	24	9	24	22	*	28
36	Electric and Electronic Equipment	5	6	29	16	6	24	W	W	22
37	Transportation Equipment	5	7	W	12	5	W	W	W	18
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	11	12	Q	38	14	Q	0	0	*
	Total	2	2	6	13	2	3	3	12	3

See footnotes at end of table.

Table B1. Relative Standard Errors for Table 1, Parts 1 and 2 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke and Breeze	Other
		West Census Region								
20	Food and Kindred Products	11	9	11	21	7	30	15	11	49
21	Tobacco Manufactures	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	23	25	0	48	27	*	0	0	Q
23	Apparel and Other Textile Products	33	31	0	0	43	Q	0	0	a
24	Lumber and Wood Products	21	13	32	17	15	21	0	0	28
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	7	7	9	13	8	11	24	0	8
2621	*Paper Mills, Except Building Paper*	8	8	13	11	W	14	W	0	9
2631	*Paperboard Mills*	16	21	19	25	18	14	45	0	17
27	Printing and Publishing	16	17	0	Q	W	49	0	0	*
28	Chemicals and Allied Products	8	12	25	33	9	9	28	27	18
2819	*Industrial Inorganic Chemicals*	17	20	28	38	19	*	28	27	27
2821	*Plastics Materials and Resins*	11	7	0	W	W	*	0	0	W
2869	*Industrial Organic Chemicals*	7	16	W	W	8	*	0	0	*
2873	*Nitrogenous Fertilizers*	13	32	0	25	12	*	0	0	*
29	Petroleum and Coal Products	4	6	7	20	W	W	0	0	7
2911	*Petroleum Refining*	4	6	W	W	W	12	0	0	5
30	Rubber and Misc. Plastics Products	17	25	36	40	15	Q	0	0	*
31	Leather and Leather Products	20	19	0	0	22	*	0	0	*
32	Stone, Clay and Glass Products	5	5	24	19	7	31	6	Q	13
3241	*Cement, Hydraulic*	6	6	13	6	7	*	7	0	13
33	Primary Metal Industries	8	9	W	W	8	15	17	17	20
3312	*Blast Furnaces and Steel Mills*	17	27	W	W	18	*	W	0	W
3334	*Primary Aluminum*	12	12	W	16	12	14	W	W	17
34	Fabricated Metal Products	14	11	0	29	17	19	0	0	24
35	Machinery, Except Electrical	12	13	0	15	14	Q	0	0	Q
36	Electric and Electronic Equipment	9	10	0	Q	9	Q	0	0	25
37	Transportation Equipment	6	6	W	25	6	11	0	W	19
38	Instruments and Related Products	15	19	Q	Q	16	Q	0	0	*
39	Misc. Manufacturing Industries	25	22	0	Q	31	Q	0	0	0
	Total	3	4	5	8	3	9	7	18	6

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

*Original estimated value less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Relative standard error greater than or equal to 50 percent.

NA=Not available. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Office of Oil and Gas, Petroleum Supply Division,"Monthly Refinery Report," for 1985.

Table B2. Relative Standard Errors for Table 2 of Detailed Statistics Section

(Percent)

Establishment Characteristics[a]	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
Value of Shipments and Receipts (million dollars)									
Under 20	4	3	7	11	3	Q	10	23	18
20-49	3	3	10	8	2	Q	6	13	14
50-99	3	3	5	7	2	6	5	9	11
100-249	3	3	5	5	2	2	4	11	5
250-499	2	5	5	6	3	6	4	12	5
500 and over	3	6	5	4	3	4	5	9	4
Not ascertained	0	0	0	0	0	0	0	0	0
Total	1	2	3	6	1	5	3	6	3
Employment Size									
Under 50	25	6	16	16	5	Q	20	Q	24
50-99	11	4	17	17	3	8	15	40	16
100-249	3	3	7	10	3	5	6	19	10
250-499	2	2	5	11	2	6	4	9	6
500-999	3	3	4	5	2	6	4	12	5
1,000 and over	2	4	4	3	3	2	2	7	4
Not ascertained	0	0	0	0	0	0	0	0	0
Total	1	2	3	6	1	5	3	6	3

[a] Value of Shipments and Receipts and Employment Size were supplied by the Bureau of the Census. See Appendix A.

Q=Relative standard error greater than or equal to 50 percent.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B3. Relative Standard Errors for Table 3 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas
				Total United States		
20	Food and Kindred Products	5	4	7	22	3
21	Tobacco Manufactures	6	6	7	29	11
22	Textile Mill Products	3	3	7	24	4
23	Apparel and Other Textile Products	8	8	29	16	12
24	Lumber and Wood Products	11	8	W	20	8
25	Furniture and Fixtures	7	7	20	20	8
26	Paper and Allied Products	3	3	W	9	4
2621	*Paper Mills, Except Building Paper*	3	4	5	9	4
2631	*Paperboard Mills*	7	8	10	10	9
27	Printing and Publishing	6	7	W	21	7
28	Chemicals and Allied Products	2	6	5	11	2
2819	*Industrial Inorganic Chemicals*	9	18	11	14	10
2821	*Plastics Materials and Resins*	8	3	4	11	W
2869	*Industrial Organic Chemicals*	3	3	W	34	4
2873	*Nitrogenous Fertilizers*	3	8	W	6	3
29	Petroleum and Coal Products	3	3	7	18	4
2911	*Petroleum Refining*	3	3	7	12	5
30	Rubber and Misc. Plastics Products	3	5	7	W	4
31	Leather and Leather Products	12	19	13	41	15
32	Stone, Clay and Glass Products	3	3	13	15	3
3241	*Cement, Hydraulic*	5	4	W	6	8
33	Primary Metal Industries	4	4	7	7	3
3312	*Blast Furnaces and Steel Mills*	5	3	8	5	4
3334	*Primary Aluminum*	8	8	W	12	W
34	Fabricated Metal Products	4	5	12	13	5
35	Machinery, Except Electrical	4	4	14	12	5
36	Electric and Electronic Equipment	3	4	8	W	3
37	Transportation Equipment	2	3	5	7	3
38	Instruments and Related Products	6	9	W	W	9
39	Misc. Manufacturing Industries	8	7	17	17	9
	Total	2	2	3	6	2
				Northeast Census Region		
20	Food and Kindred Products	8	8	11	18	8
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	9	12	12	24	12
23	Apparel and Other Textile Products	16	16	40	21	38
24	Lumber and Wood Products	39	26	Q	Q	27
25	Furniture and Fixtures	20	17	41	29	24
26	Paper and Allied Products	W	5	6	18	14
2621	*Paper Mills, Except Building Paper*	W	6	7	17	W
2631	*Paperboard Mills*	14	14	22	Q	W
27	Printing and Publishing	W	13	Q	25	W
28	Chemicals and Allied Products	5	10	8	21	8
2819	*Industrial Inorganic Chemicals*	13	17	20	28	13
2821	*Plastics Materials and Resins*	W	11	5	17	12
2869	*Industrial Organic Chemicals*	8	6	17	W	W
2873	*Nitrogenous Fertilizers*	W	W	W	*	*
29	Petroleum and Coal Products	9	11	W	W	13
2911	*Petroleum Refining*	10	11	W	W	W
30	Rubber and Misc. Plastics Products	8	12	11	20	9
31	Leather and Leather Products	11	13	15	28	W
32	Stone, Clay and Glass Products	6	6	15	21	7
3241	*Cement, Hydraulic*	9	8	Q	10	Q
33	Primary Metal Industries	8	8	W	17	5
3312	*Blast Furnaces and Steel Mills*	W	6	W	7	6
3334	*Primary Aluminum*	W	W	W	W	W
34	Fabricated Metal Products	9	12	15	17	11
35	Machinery, Except Electrical	8	9	15	20	11
36	Electric and Electronic Equipment	W	10	9	W	8
37	Transportation Equipment	5	7	5	W	W
38	Instruments and Related Products	6	14	9	28	14
39	Misc. Manufacturing Industries	15	12	W	W	14
	Total	3	3	4	8	3

See footnotes at end of table.

Table B3. Relative Standard Errors for Table 3 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Groups and Industry	LPG	Coal	Coke & Breeze	Major Byproducts	Other
				Total United States		
20	Food and Kindred Products	28	5	9	Q	31
21	Tobacco Manufactures	14	8	0	0	*
22	Textile Mill Products	11	7	0	0	9
23	Apparel and Other Textile Products	31	21	0	0	*
24	Lumber and Wood Products	W	W	0	*	15
25	Furniture and Fixtures	21	15	0	0	19
26	Paper and Allied Products	6	5	0	4	W
2621	*Paper Mills, Except Building Paper*	8	5	0	5	4
2631	*Paperboard Mills*	10	10	0	8	8
27	Printing and Publishing	28	39	0	0	W
28	Chemicals and Allied Products	W	3	W	13	9
2819	*Industrial Inorganic Chemicals*	12	16	0	0	19
2821	*Plastics Materials and Resins*	7	5	0	W	26
2869	*Industrial Organic Chemicals*	8	W	0	W	W
2873	*Nitrogenous Fertilizers*	*	0	0	0	W
29	Petroleum and Coal Products	8	9	0	3	5
2911	*Petroleum Refining*	7	9	0	3	5
30	Rubber and Misc. Plastics Products	14	W	0	0	17
31	Leather and Leather Products	40	33	0	0	*
32	Stone, Clay and Glass Products	17	5	17	*	11
3241	*Cement, Hydraulic*	12	5	W	*	W
33	Primary Metal Industries	11	8	6	5	9
3312	*Blast Furnaces and Steel Mills*	8	9	6	5	10
3334	*Primary Aluminum*	W	0	0	0	W
34	Fabricated Metal Products	14	6	16	0	13
35	Machinery, Except Electrical	15	5	32	0	14
36	Electric and Electronic Equipment	14	W	14	0	15
37	Transportation Equipment	17	4	11	0	8
38	Instruments and Related Products	Q	W	0	0	38
39	Misc. Manufacturing Industries	35	17	0	0	Q
	Total	5	2	6	3	4
				Northeast Census Region		
20	Food and Kindred Products	29	15	0	0	49
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	20	22	0	0	19
23	Apparel and Other Textile Products	Q	0	0	0	*
24	Lumber and Wood Products	Q	0	0	0	Q
25	Furniture and Fixtures	Q	Q	0	0	Q
26	Paper and Allied Products	W	9	0	8	W
2621	*Paper Mills, Except Building Paper*	11	W	0	W	8
2631	*Paperboard Mills*	33	W	0	0	*
27	Printing and Publishing	Q	Q	0	0	W
28	Chemicals and Allied Products	26	7	0	0	14
2819	*Industrial Inorganic Chemicals*	27	37	0	0	*
2821	*Plastics Materials and Resins*	*	W	0	0	10
2869	*Industrial Organic Chemicals*	Q	0	0	0	6
2873	*Nitrogenous Fertilizers*	*	0	0	0	W
29	Petroleum and Coal Products	W	W	0	10	12
2911	*Petroleum Refining*	W	W	0	10	12
30	Rubber and Misc. Plastics Products	25	0	0	0	39
31	Leather and Leather Products	43	36	0	0	*
32	Stone, Clay and Glass Products	W	W	W	*	W
3241	*Cement, Hydraulic*	*	8	0	*	29
33	Primary Metal Industries	29	W	W	W	18
3312	*Blast Furnaces and Steel Mills*	12	W	W	W	W
3334	*Primary Aluminum*	*	0	0	0	W
34	Fabricated Metal Products	36	W	W	0	41
35	Machinery, Except Electrical	32	22	Q	0	17
36	Electric and Electronic Equipment	23	W	W	0	W
37	Transportation Equipment	42	W	0	0	16
38	Instruments and Related Products	*	W	0	0	W
39	Misc. Manufacturing Industries	18	W	0	0	Q
	Total	W	W	W	6	7

Table B3. Relative Standard Errors for Table 3 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas
		Midwest Census Region				
20	Food and Kindred Products	4	5	12	42	5
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	15	15	38	42	17
24	Lumber and Wood Products	18	20	W	W	19
25	Furniture and Fixtures	11	11	W	Q	W
26	Paper and Allied Products	W	5	W	W	9
2621	*Paper Mills, Except Building Paper*	6	6	10	W	6
2631	*Paperboard Mills*	13	12	31	20	13
27	Printing and Publishing	W	10	W	Q	W
28	Chemicals and Allied Products	8	18	14	14	4
2819	*Industrial Inorganic Chemicals*	25	34	36	19	11
2821	*Plastics Materials and Resins*	W	6	9	W	W
2869	*Industrial Organic Chemicals*	4	4	8	8	W
2873	*Nitrogenous Fertilizers*	5	4	0	W	W
29	Petroleum and Coal Products	7	6	W	27	W
2911	*Petroleum Refining*	8	7	W	W	8
30	Rubber and Misc. Plastics Products	5	7	10	W	7
31	Leather and Leather Products	27	47	W	Q	15
32	Stone, Clay and Glass Products	5	5	18	44	5
3241	*Cement, Hydraulic*	W	8	19	W	17
33	Primary Metal Industries	5	6	8	7	4
3312	*Blast Furnaces and Steel Mills*	6	5	W	8	6
3334	*Primary Aluminum*	19	W	0	W	W
34	Fabricated Metal Products	5	5	W	W	5
35	Machinery, Except Electrical	5	6	40	10	7
36	Electric and Electronic Equipment	4	6	9	W	5
37	Transportation Equipment	3	3	9	W	4
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	12	12	Q	W	14
	Total	3	4	7	13	2
		South Census Region				
20	Food and Kindred Products	13	7	17	48	5
21	Tobacco Manufactures	6	6	7	29	11
22	Textile Mill Products	3	4	8	35	4
23	Apparel and Other Textile Products	10	10	Q	28	15
24	Lumber and Wood Products	14	10	31	36	12
25	Furniture and Fixtures	11	11	25	28	14
26	Paper and Allied Products	5	5	W	W	6
2621	*Paper Mills, Except Building Paper*	W	6	11	W	W
2631	*Paperboard Mills*	8	9	13	11	12
27	Printing and Publishing	11	13	W	38	14
28	Chemicals and Allied Products	3	4	6	6	3
2819	*Industrial Inorganic Chemicals*	9	16	15	15	12
2821	*Plastics Materials and Resins*	10	4	8	W	W
2869	*Industrial Organic Chemicals*	3	4	W	W	4
2873	*Nitrogenous Fertilizers*	W	W	W	W	W
29	Petroleum and Coal Products	5	5	10	34	5
2911	*Petroleum Refining*	5	5	W	16	6
30	Rubber and Misc. Plastics Products	5	6	8	W	6
31	Leather and Leather Products	29	15	W	Q	W
32	Stone, Clay and Glass Products	5	5	18	22	5
3241	*Cement, Hydraulic*	W	8	W	W	W
33	Primary Metal Industries	6	7	16	12	5
3312	*Blast Furnaces and Steel Mills*	8	6	17	W	7
3334	*Primary Aluminum*	12	13	0	18	W
34	Fabricated Metal Products	8	10	W	W	9
35	Machinery, Except Electrical	7	8	20	24	9
36	Electric and Electronic Equipment	5	6	29	16	6
37	Transportation Equipment	5	7	W	W	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	11	12	Q	38	14
	Total	2	2	4	11	2

See footnotes at end of table.

Table B3. Relative Standard Errors for Table 3 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	LPG	Coal	Coke & Breeze	Major Byproducts	Other
		Midwest Census Region				
20	Food and Kindred Products	Q	6	13	0	Q
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	Q	40	0	0	*
24	Lumber and Wood Products	W	W	0	*	29
25	Furniture and Fixtures	22	W	0	0	26
26	Paper and Allied Products	15	11	0	9	W
2621	*Paper Mills, Except Building Paper*	7	7	0	10	9
2631	*Paperboard Mills*	14	15	0	32	26
27	Printing and Publishing	W	40	0	0	W
28	Chemicals and Allied Products	W	4	0	Q	W
2819	*Industrial Inorganic Chemicals*	*	21	0	0	22
2821	*Plastics Materials and Resins*	W	W	0	0	W
2869	*Industrial Organic Chemicals*	6	6	0	0	W
2873	*Nitrogenous Fertilizers*	W	0	0	0	W
29	Petroleum and Coal Products	W	23	0	7	39
2911	*Petroleum Refining*	10	W	0	7	W
30	Rubber and Misc. Plastics Products	W	W	0	0	30
31	Leather and Leather Products	*	41	0	0	*
32	Stone, Clay and Glass Products	18	9	30	0	15
3241	*Cement, Hydraulic*	*	8	W	0	W
33	Primary Metal Industries	16	11	7	6	12
3312	*Blast Furnaces and Steel Mills*	7	W	W	W	W
3334	*Primary Aluminum*	W	0	0	0	W
34	Fabricated Metal Products	W	6	W	0	13
35	Machinery, Except Electrical	24	5	35	0	23
36	Electric and Electronic Equipment	W	W	0	0	W
37	Transportation Equipment	26	4	12	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	*	W	0	0	*
	Total	12	4	7	5	11
		South Census Region				
20	Food and Kindred Products	20	13	24	Q	49
21	Tobacco Manufactures	15	8	0	0	*
22	Textile Mill Products	14	7	0	0	10
23	Apparel and Other Textile Products	32	24	0	0	*
24	Lumber and Wood Products	34	0	0	0	17
25	Furniture and Fixtures	31	18	0	0	23
26	Paper and Allied Products	W	7	0	5	5
2621	*Paper Mills, Except Building Paper*	10	W	0	6	6
2631	*Paperboard Mills*	12	12	0	9	9
27	Printing and Publishing	W	0	0	0	34
28	Chemicals and Allied Products	W	3	W	8	9
2819	*Industrial Inorganic Chemicals*	16	22	0	0	35
2821	*Plastics Materials and Resins*	W	W	0	W	W
2869	*Industrial Organic Chemicals*	8	W	0	W	W
2873	*Nitrogenous Fertilizers*	W	0	0	0	W
29	Petroleum and Coal Products	W	W	0	5	6
2911	*Petroleum Refining*	W	W	0	5	6
30	Rubber and Misc. Plastics Products	W	12	0	0	14
31	Leather and Leather Products	Q	Q	0	0	W
32	Stone, Clay and Glass Products	W	9	W	*	W
3241	*Cement, Hydraulic*	*	10	W	0	W
33	Primary Metal Industries	11	14	10	9	12
3312	*Blast Furnaces and Steel Mills*	13	W	W	9	W
3334	*Primary Aluminum*	W	0	0	0	*
34	Fabricated Metal Products	W	W	W	0	W
35	Machinery, Except Electrical	24	22	*	0	*
36	Electric and Electronic Equipment	W	W	Q	0	*
37	Transportation Equipment	16	W	W	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	Q	0	0	0	*
	Total	6	3	10	3	5

Table B3. Relative Standard Errors for Table 3 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas
		West Census Region				
20	Food and Kindred Products	11	9	11	21	7
21	Tobacco Manufactures	0	0	0	0	0
22	Textile Mill Products	23	25	0	48	27
23	Apparel and Other Textile Products	34	31	0	0	45
24	Lumber and Wood Products	21	13	31	W	15
25	Furniture and Fixtures	NA	NA	NA	NA	NA
26	Paper and Allied Products	7	7	9	14	8
2621	*Paper Mills, Except Building Paper*	W	8	13	W	W
2631	*Paperboard Mills*	16	21	19	25	W
27	Printing and Publishing	16	17	0	Q	W
28	Chemicals and Allied Products	9	12	25	37	8
2819	*Industrial Inorganic Chemicals*	17	20	28	43	20
2821	*Plastics Materials and Resins*	11	7	0	W	W
2869	*Industrial Organic Chemicals*	7	16	W	W	8
2873	*Nitrogenous Fertilizers*	W	W	0	25	12
29	Petroleum and Coal Products	6	6	7	W	W
2911	*Petroleum Refining*	6	6	W	W	W
30	Rubber and Misc. Plastics Products	17	25	36	40	15
31	Leather and Leather Products	20	19	0	*	22
32	Stone, Clay and Glass Products	5	5	24	19	7
3241	*Cement, Hydraulic*	6	6	13	6	7
33	Primary Metal Industries	8	9	W	16	8
3312	*Blast Furnaces and Steel Mills*	W	27	W	W	18
3334	*Primary Aluminum*	W	12	W	16	W
34	Fabricated Metal Products	14	11	0	29	17
35	Machinery, Except Electrical	12	13	0	15	13
36	Electric and Electronic Equipment	W	10	0	Q	9
37	Transportation Equipment	6	6	W	25	6
38	Instruments and Related Products	15	19	Q	Q	16
39	Misc. Manufacturing Industries	25	22	0	0	31
	Total	3	4	5	8	3

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

*Original estimated value less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Relative standard error greater than or equal to 50 percent.

NA=Not available. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B3. Relative Standard Errors for Table 3 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	LPG	Coal	Coke & Breeze	Major Byproducts	Other
		West Census Region				
20	Food and Kindred Products	30	15	11	0	49
21	Tobacco Manufactures	0	0	0	0	0
22	Textile Mill Products	*	0	0	0	Q
23	Apparel and Other Textile Products	Q	0	0	0	0
24	Lumber and Wood Products	20	0	0	0	28
25	Furniture and Fixtures	NA	NA	NA	NA	NA
26	Paper and Allied Products	11	24	0	9	9
2621	*Paper Mills, Except Building Paper*	14	W	0	W	9
2631	*Paperboard Mills*	15	W	0	17	19
27	Printing and Publishing	49	0	0	0	*
28	Chemicals and Allied Products	W	28	0	0	W
2819	*Industrial Inorganic Chemicals*	*	28	0	0	30
2821	*Plastics Materials and Resins*	W	0	0	0	*
2869	*Industrial Organic Chemicals*	*	0	0	0	W
2873	*Nitrogenous Fertilizers*	*	0	0	0	*
29	Petroleum and Coal Products	W	0	0	6	6
2911	*Petroleum Refining*	W	0	0	6	W
30	Rubber and Misc. Plastics Products	Q	0	0	0	*
31	Leather and Leather Products	*	0	0	0	*
32	Stone, Clay and Glass Products	W	W	Q	0	13
3241	*Cement, Hydraulic*	*	7	0	0	15
33	Primary Metal Industries	15	W	W	W	21
3312	*Blast Furnaces and Steel Mills*	*	W	W	W	W
3334	*Primary Aluminum*	W	0	0	0	*
34	Fabricated Metal Products	W	0	0	0	W
35	Machinery, Except Electrical	Q	0	0	0	Q
36	Electric and Electronic Equipment	Q	0	0	0	W
37	Transportation Equipment	9	0	W	0	19
38	Instruments and Related Products	Q	0	0	0	*
39	Misc. Manufacturing Industries	Q	0	0	0	0
	Total	W	W	W	5	11

Table B4. Relative Standard Errors for Table 4 of Detailed Statistics Section

(Percent)

Establishment Characteristics[a]	Total	Net Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Major By-products	Other
Value of Shipments and Receipts (million dollars)										
Under 20	4	3	8	9	3	W	11	W	22	W
20-49	3	3	6	9	2	W	6	13	16	W
50-99	3	3	5	7	2	5	4	10	7	17
100-249	3	3	5	W	2	6	W	W	5	8
250-499	3	5	5	W	3	6	W	W	5	5
500 and Over	3	6	5	W	3	6	W	W	3	4
Total	2	2	3	6	2	5	2	6	3	4
Employment Size										
Under 50	6	6	16	14	5	25	W	W	Q	36
50-99	4	4	11	15	4	12	15	41	11	20
100-249	3	3	5	10	3	8	6	22	6	14
250-499	3	2	5	11	2	5	4	12	5	9
500-999	3	3	4	5	3	8	W	W	4	7
1,000 and over	3	4	4	4	3	7	3	6	4	4
Total	2	2	3	6	2	5	2	6	3	4

[a] Value of Shipments and Receipts and Employment Size were supplied by the Bureau of the Census. See Appendix A.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Relative standard error greater than or equal to 50 percent.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B5. Relative Standard Errors for Table 5 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
		Total United States							
20	Food and Kindred Products	21	40	Q	23	30	0	0	*
21	Tobacco Manufactures	0	0	0	0	0	0	0	0
22	Textile Mill Products	46	*	Q	Q	*	0	0	*
23	Apparel and Other Textile Products	Q	0	0	Q	*	0	0	*
24	Lumber and Wood Products	41	Q	37	Q	Q	0	0	*
25	Furniture and Fixtures	Q	0	0	0	0	0	0	Q
26	Paper and Allied Products	21	W	13	19	Q	0	0	W
2621	*Paper Mills, Except Building Paper*	22	0	17	26	0	0	0	0
2631	*Paperboard Mills*	25	35	19	23	*	0	0	36
27	Printing and Publishing	*	W	*	0	*	0	0	Q
28	Chemicals and Allied Products	3	18	33	3	W	8	W	5
2819	*Industrial Inorganic Chemicals*	13	36	23	28	*	32	18	17
2821	*Plastics Materials and Resins*	5	0	Q	W	6	W	0	12
2869	*Industrial Organic Chemicals*	7	W	6	3	10	W	0	W
2873	*Nitrogenous Fertilizers*	4	0	7	4	W	0	0	W
29	Petroleum and Coal Products	1	Q	Q	0	0	0	0	1
2911	*Petroleum Refining*	0	0	0	0	0	0	0	0
30	Rubber and Misc. Plastics Products	17	0	Q	*	33	W	0	Q
31	Leather and Leather Products	Q	0	Q	0	0	0	0	Q
32	Stone, Clay and Glass Products	49	Q	Q	Q	43	Q	Q	*
3241	*Cement, Hydraulic*	*	0	16	*	*	0	0	*
33	Primary Metal Industries	5	0	33	19	Q	5	12	12
3312	*Blast Furnaces and Steel Mills*	5	0	8	Q	*	5	13	24
3334	*Primary Aluminum*	11	0	0	W	0	16	W	12
34	Fabricated Metal Products	23	0	44	28	25	Q	45	*
35	Machinery, Except Electrical	29	0	Q	35	33	0	0	*
36	Electric and Electronic Equipment	12	0	W	23	14	W	9	20
37	Transportation Equipment	9	0	14	11	18	0	Q	17
38	Instruments and Related Products	*	W	W	*	*	0	0	*
39	Misc. Manufacturing Industries	*	0	Q	*	19	0	0	*
	Total	2	19	29	3	6	5	12	1
		Northeast Census Region							
20	Food and Kindred Products	*	0	Q	Q	Q	0	0	*
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	Q	0	0	0	Q	0	0	0
23	Apparel and Other Textile Products	0	0	0	0	0	0	0	0
24	Lumber and Wood Products	0	0	0	0	0	0	0	0
25	Furniture and Fixtures	0	0	0	0	0	0	0	0
26	Paper and Allied Products	W	Q	W	W	Q	0	0	W
2621	*Paper Mills, Except Building Paper*	W	0	26	W	0	0	0	0
2631	*Paperboard Mills*	Q	0	0	0	Q	0	0	0
27	Printing and Publishing	Q	0	0	0	0	0	0	Q
28	Chemicals and Allied Products	Q	0	Q	47	Q	*	0	13
2819	*Industrial Inorganic Chemicals*	*	0	*	*	*	*	0	*
2821	*Plastics Materials and Resins*	W	0	W	0	W	0	0	*
2869	*Industrial Organic Chemicals*	Q	0	W	W	Q	0	0	*
2873	*Nitrogenous Fertilizers*	*	0	0	0	0	0	0	*
29	Petroleum and Coal Products	1	Q	Q	Q	0	0	0	0
2911	*Petroleum Refining*	0	0	0	0	0	0	0	0
30	Rubber and Misc. Plastics Products	*	0	*	*	Q	0	0	0
31	Leather and Leather Products	Q	0	0	0	0	0	0	Q
32	Stone, Clay and Glass Products	*	Q	29	*	*	0	0	*
3241	*Cement, Hydraulic*	*	0	23	*	*	0	0	*
33	Primary Metal Industries	11	0	Q	Q	Q	W	36	37
3312	*Blast Furnaces and Steel Mills*	W	0	W	0	0	W	W	W
3334	*Primary Aluminum*	W	0	0	0	0	W	0	W
34	Fabricated Metal Products	32	0	Q	46	34	0	W	Q
35	Machinery, Except Electrical	*	0	Q	Q	*	0	0	Q
36	Electric and Electronic Equipment	W	0	W	*	15	0	W	W
37	Transportation Equipment	15	0	W	W	W	0	0	*
38	Instruments and Related Products	Q	0	0	Q	Q	0	0	0
39	Misc. Manufacturing Industries	*	0	*	*	1	0	0	*
	Total	8	Q	25	24	Q	W	33	1

See footnotes at end of table.

Table B5. Relative Standard Errors for Table 5 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
		Midwest Census Region							
20	Food and Kindred Products	30	40	Q	12	29	0	0	*
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	*	0	0	0	*	0	0	Q
24	Lumber and Wood Products	*	0	W	0	*	0	0	*
25	Furniture and Fixtures	Q	0	0	0	0	0	0	Q
26	Paper and Allied Products	W	Q	W	Q	0	0	0	Q
2621	*Paper Mills, Except Building Paper*	*	0	W	0	0	0	0	0
2631	*Paperboard Mills*	Q	Q	Q	0	0	0	0	Q
27	Printing and Publishing	Q	0	Q	0	Q	0	0	0
28	Chemicals and Allied Products	10	0	Q	4	W	*	0	W
2819	*Industrial Inorganic Chemicals*	29	0	0	*	0	*	0	*
2821	*Plastics Materials and Resins*	W	0	W	W	W	0	0	W
2869	*Industrial Organic Chemicals*	9	0	W	W	W	0	0	W
2873	*Nitrogenous Fertilizers*	4	0	W	W	W	0	0	W
29	Petroleum and Coal Products	1	Q	Q	*	0	0	0	1
2911	*Petroleum Refining*	0	0	0	*	0	0	0	0
30	Rubber and Misc. Plastics Products	21	0	Q	Q	Q	W	0	Q
31	Leather and Leather Products	Q	0	Q	0	0	0	0	0
32	Stone, Clay and Glass Products	Q	0	32	Q	14	Q	Q	*
3241	*Cement, Hydraulic*	W	0	W	0	0	0	0	0
33	Primary Metal Industries	7	0	21	31	Q	7	16	21
3312	*Blast Furnaces and Steel Mills*	7	0	W	Q	*	7	W	W
3334	*Primary Aluminum*	W	0	0	0	0	W	W	W
34	Fabricated Metal Products	49	0	26	Q	37	Q	0	Q
35	Machinery, Except Electrical	20	0	34	22	42	0	0	*
36	Electric and Electronic Equipment	*	0	W	*	Q	W	W	W
37	Transportation Equipment	9	0	W	10	27	0	Q	W
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	Q	0	0	Q	0	0	0	Q
	Total	4	Q	Q	4	18	7	16	1
		South Census Region							
20	Food and Kindred Products	36	0	Q	41	Q	0	0	0
21	Tobacco Manufactures	0	0	0	0	0	0	0	0
22	Textile Mill Products	Q	0	Q	Q	*	0	0	*
23	Apparel and Other Textile Products	Q	0	0	Q	0	0	0	Q
24	Lumber and Wood Products	Q	0	Q	Q	Q	0	0	Q
25	Furniture and Fixtures	0	0	0	0	0	0	0	0
26	Paper and Allied Products	29	W	W	23	Q	0	0	45
2621	*Paper Mills, Except Building Paper*	W	0	W	0	0	0	0	0
2631	*Paperboard Mills*	29	31	22	24	*	0	0	45
27	Printing and Publishing	*	W	0	0	W	0	0	0
28	Chemicals and Allied Products	3	18	9	3	W	8	W	6
2819	*Industrial Inorganic Chemicals*	14	36	24	29	*	32	22	25
2821	*Plastics Materials and Resins*	6	0	Q	W	W	W	0	W
2869	*Industrial Organic Chemicals*	4	W	W	3	4	W	0	W
2873	*Nitrogenous Fertilizers*	4	0	W	W	W	0	0	0
29	Petroleum and Coal Products	1	Q	Q	0	0	0	0	1
2911	*Petroleum Refining*	0	0	0	0	0	0	0	0
30	Rubber and Misc. Plastics Products	*	0	Q	Q	W	0	0	Q
31	Leather and Leather Products	0	0	0	0	0	0	0	0
32	Stone, Clay and Glass Products	Q	Q	Q	Q	Q	0	Q	*
3241	*Cement, Hydraulic*	W	0	W	0	0	0	0	0
33	Primary Metal Industries	8	0	25	19	*	9	13	20
3312	*Blast Furnaces and Steel Mills*	9	0	12	0	0	9	17	*
3334	*Primary Aluminum*	17	0	0	W	0	22	W	17
34	Fabricated Metal Products	40	0	Q	44	Q	0	Q	*
35	Machinery, Except Electrical	*	0	Q	Q	Q	0	0	*
36	Electric and Electronic Equipment	19	0	0	*	W	0	W	W
37	Transportation Equipment	34	0	W	W	*	0	0	Q
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	*	0	*	*	0	0	0	*
	Total	2	20	40	3	3	8	23	1

See footnotes at end of table.

Table B5. Relative Standard Errors for Table 5 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
		West Census Region							
20	Food and Kindred Products	*	0	0	*	Q	0	0	Q
21	Tobacco Manufactures	0	0	0	0	0	0	0	0
22	Textile Mill Products	0	0	0	0	0	0	0	0
23	Apparel and Other Textile Products	Q	0	0	Q	0	0	0	0
24	Lumber and Wood Products	Q	Q	Q	0	Q	0	0	*
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	40	45	15	*	*	0	0	*
2621	*Paper Mills, Except Building Paper*	W	0	W	0	0	0	0	0
2631	*Paperboard Mills*	45	45	45	*	*	0	0	0
27	Printing and Publishing	*	0	*	0	0	0	0	0
28	Chemicals and Allied Products	11	0	29	12	W	0	27	W
2819	*Industrial Inorganic Chemicals*	25	0	30	*	Q	0	27	*
2821	*Plastics Materials and Resins*	*	0	0	0	*	0	0	0
2869	*Industrial Organic Chemicals*	0	0	0	0	0	0	0	0
2873	*Nitrogenous Fertilizers*	12	0	0	12	*	0	0	*
29	Petroleum and Coal Products	4	0	Q	0	0	0	0	4
2911	*Petroleum Refining*	0	0	0	0	0	0	0	0
30	Rubber and Misc. Plastics Products	Q	0	0	0	Q	0	0	0
31	Leather and Leather Products	0	0	0	0	0	0	0	0
32	Stone, Clay and Glass Products	*	Q	40	Q	*	0	0	*
3241	*Cement, Hydraulic*	0	0	0	0	0	0	0	0
33	Primary Metal Industries	17	0	W	Q	*	W	28	18
3312	*Blast Furnaces and Steel Mills*	W	0	0	0	0	W	0	Q
3334	*Primary Aluminum*	15	0	0	0	0	W	W	17
34	Fabricated Metal Products	*	0	0	*	Q	0	0	Q
35	Machinery, Except Electrical	Q	0	Q	Q	0	0	0	0
36	Electric and Electronic Equipment	W	0	0	0	0	0	0	W
37	Transportation Equipment	Q	0	0	Q	Q	0	0	Q
38	Instruments and Related Products	Q	0	0	0	0	0	0	Q
39	Misc. Manufacturing Industries	Q	0	Q	0	0	0	0	0
	Total	4	35	19	12	31	W	24	4

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

*Original estimated value less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Relative standard error greater than or equal to 50 percent.

NA=Not available. Data are included in higher level totals.

Sources: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey," and Office of Oil and Gas, Petroleum Supply Division Form EIA-810, "Monthly Refinery Report," for 1985.

Table B6. Relative Standard Errors for Table 6 of Detailed Statistics Section
(Percent)

Establishment Characteristics[a]	Total	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
Value of Shipments and Receipts (million dollars)								
Under 20	28	11	47	24	Q	23	Q	Q
20-49	11	25	28	5	Q	28	23	W
50-99	7	26	22	4	7	11	16	40
100-249	4	31	W	4	5	W	W	7
250-499	4	13	W	5	6	W	W	5
500 and Over	5	0	W	4	5	W	W	10
Not ascertained	0	0	0	0	0	0	0	0
Total	2	19	31	3	6	5	12	10
Employment Size								
Under 50	34	Q	Q	7	Q	W	Q	Q
50-99	11	40	Q	5	10	48	40	Q
100-249	6	22	24	7	7	23	33	11
250-499	4	41	21	8	6	12	14	28
500-999	4	19	9	5	7	W	W	6
1,000 and Over	4	16	8	4	5	6	14	7
Not ascertained	0	0	0	0	0	0	0	0
Total	2	19	31	3	6	5	12	10

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.
W = Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q = Relative standard error greater than or equal to 50 percent.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B7. Relative Standard Errors for Table 7 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
		Total United States								
20	Food and Kindred Products	4	4	7	21	3	28	5	9	40
21	Tobacco Manufactures	6	6	7	29	11	14	8	0	*
22	Textile Mill Products	3	3	7	24	4	11	7	0	9
23	Apparel and Other Textile Products	8	8	29	17	12	31	21	0	*
24	Lumber and Wood Products	10	7	W	20	8	17	W	0	20
25	Furniture and Fixtures	7	7	20	20	8	21	15	0	26
26	Paper and Allied Products	3	3	4	9	4	6	5	0	5
2621	*Paper Mills, Except Building Paper*	3	4	5	9	4	8	5	0	5
2631	*Paperboard Mills*	6	7	10	10	9	10	10	0	9
27	Printing and Publishing	6	7	19	21	7	28	39	0	16
28	Chemicals and Allied Products	2	5	5	12	2	5	3	0	13
2819	*Industrial Inorganic Chemicals*	9	18	11	14	10	12	16	0	12
2821	*Plastics Materials and Resins*	4	3	4	16	W	7	W	0	14
2869	*Industrial Organic Chemicals*	3	2	8	34	4	6	4	0	6
2873	*Nitrogenous Fertilizers*	3	8	W	6	3	*	0	0	W
29	Petroleum and Coal Products	4	3	24	25	5	33	9	0	9
2911	*Petroleum Refining*	4	4	14	18	5	18	9	0	9
30	Rubber and Misc. Plastics Products	3	5	7	13	4	14	7	0	20
31	Leather and Leather Products	12	19	13	41	15	40	33	0	*
32	Stone, Clay and Glass Products	3	3	13	15	3	17	5	17	18
3241	*Cement, Hydraulic*	5	4	W	6	8	12	5	W	W
33	Primary Metal Industries	3	4	7	7	3	11	8	7	8
3312	*Blast Furnaces and Steel Mills*	4	3	8	5	4	8	9	8	9
3334	*Primary Aluminum*	8	8	W	12	8	W	0	0	23
34	Fabricated Metal Products	4	5	12	13	5	14	6	16	13
35	Machinery, Except Electrical	4	4	14	12	5	15	5	32	11
36	Electric and Electronic Equipment	3	4	8	12	3	14	5	14	14
37	Transportation Equipment	2	3	5	7	3	17	4	11	7
38	Instruments and Related Products	5	9	W	23	9	Q	W	0	17
39	Misc. Manufacturing Industries	6	7	17	17	9	35	17	0	*
	Total	1	2	3	6	2	6	2	6	5
		Northeast Census Region								
20	Food and Kindred Products	8	8	11	18	8	29	15	0	Q
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	9	12	12	24	12	20	22	0	19
23	Apparel and Other Textile Products	16	16	40	21	38	Q	0	0	*
24	Lumber and Wood Products	34	26	Q	Q	27	Q	0	0	*
25	Furniture and Fixtures	18	17	41	29	24	Q	Q	0	Q
26	Paper and Allied Products	5	5	6	W	W	9	9	0	W
2621	*Paper Mills, Except Building Paper*	5	5	7	17	10	11	10	0	10
2631	*Paperboard Mills*	14	14	22	Q	W	33	W	0	*
27	Printing and Publishing	12	13	Q	25	14	Q	Q	0	W
28	Chemicals and Allied Products	5	9	8	22	8	26	7	0	9
2819	*Industrial Inorganic Chemicals*	13	17	20	28	13	27	37	0	*
2821	*Plastics Materials and Resins*	7	11	5	22	W	*	W	0	W
2869	*Industrial Organic Chemicals*	8	6	17	47	3	Q	0	0	6
2873	*Nitrogenous Fertilizers*	W	W	W	*	*	*	0	0	W
29	Petroleum and Coal Products	12	11	W	W	W	*	W	0	*
2911	*Petroleum Refining*	12	12	Q	W	14	Q	W	0	*
30	Rubber and Misc. Plastics Products	8	12	11	20	9	25	0	0	38
31	Leather and Leather Products	11	13	15	28	W	43	36	0	W
32	Stone, Clay and Glass Products	6	6	15	21	7	29	W	W	W
3241	*Cement, Hydraulic*	9	8	Q	10	Q	*	8	0	24
33	Primary Metal Industries	5	8	W	17	5	29	16	W	16
3312	*Blast Furnaces and Steel Mills*	6	6	W	W	6	12	13	W	17
3334	*Primary Aluminum*	W	W	W	W	W	*	0	0	*
34	Fabricated Metal Products	9	12	15	17	11	36	W	46	W
35	Machinery, Except Electrical	8	9	15	20	11	32	22	Q	*
36	Electric and Electronic Equipment	7	9	9	17	8	23	W	W	W
37	Transportation Equipment	5	7	5	11	W	42	W	0	16
38	Instruments and Related Products	6	13	9	W	14	*	W	0	W
39	Misc. Manufacturing Industries	9	12	W	W	14	18	W	0	Q
	Total	2	3	4	8	3	8	4	11	9

See footnotes at end of table.

Table B7. Relative Standard Errors for Table 7 of Detailed Statistics Section (Continued)
(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
					Midwest Census Region					
20	Food and Kindred Products	4	5	12	42	5	Q	6	13	22
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	15	15	38	42	17	Q	40	0	*
24	Lumber and Wood Products	16	20	W	W	19	41	W	0	41
25	Furniture and Fixtures	10	11	W	Q	W	22	W	0	27
26	Paper and Allied Products	6	5	10	W	W	15	11	0	W
2621	*Paper Mills, Except Building Paper*	5	6	10	15	6	7	7	0	11
2631	*Paperboard Mills*	11	12	31	20	13	14	15	0	24
27	Printing and Publishing	9	10	W	Q	10	23	40	0	W
28	Chemicals and Allied Products	8	18	14	14	4	13	4	0	Q
2819	*Industrial Inorganic Chemicals*	25	34	36	19	11	*	21	0	25
2821	*Plastics Materials and Resins*	6	6	9	W	6	W	W	0	W
2869	*Industrial Organic Chemicals*	5	4	W	8	9	*	6	0	6
2873	*Nitrogenous Fertilizers*	5	4	0	8	5	*	0	0	*
29	Petroleum and Coal Products	7	6	W	36	W	Q	23	0	23
2911	*Petroleum Refining*	7	7	Q	0	8	*	W	0	W
30	Rubber and Misc. Plastics Products	6	7	10	26	7	10	9	0	39
31	Leather and Leather Products	27	47	W	Q	15	*	41	0	*
32	Stone, Clay and Glass Products	5	5	18	44	5	18	9	30	24
3241	*Cement, Hydraulic*	8	8	19	8	17	*	8	W	W
33	Primary Metal Industries	4	6	8	7	4	16	11	8	9
3312	*Blast Furnaces and Steel Mills*	6	5	8	8	6	7	11	9	12
3334	*Primary Aluminum*	W	W	0	W	W	W	0	0	*
34	Fabricated Metal Products	5	5	W	27	5	W	6	23	13
35	Machinery, Except Electrical	5	6	40	10	7	24	5	35	13
36	Electric and Electronic Equipment	4	6	9	37	5	25	6	0	31
37	Transportation Equipment	3	3	9	12	4	26	4	12	7
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	12	12	Q	W	14	*	W	0	Q
	Total	2	4	5	13	2	16	1	8	18
					South Census Region					
20	Food and Kindred Products	9	7	17	48	5	20	13	24	Q
21	Tobacco Manufactures	6	6	7	29	11	15	8	0	*
22	Textile Mill Products	3	4	8	35	4	14	7	0	10
23	Apparel and Other Textile Products	10	10	Q	28	15	32	24	0	*
24	Lumber and Wood Products	15	11	31	36	12	34	0	0	29
25	Furniture and Fixtures	10	11	25	28	14	31	18	0	34
26	Paper and Allied Products	4	4	7	10	6	12	7	0	6
2621	*Paper Mills, Except Building Paper*	5	6	11	13	W	10	W	0	7
2631	*Paperboard Mills*	8	9	13	11	12	12	12	0	10
27	Printing and Publishing	11	13	19	38	14	30	0	0	35
28	Chemicals and Allied Products	2	4	6	6	3	6	3	0	12
2819	*Industrial Inorganic Chemicals*	9	15	15	15	13	16	22	0	14
2821	*Plastics Materials and Resins*	5	4	9	20	5	8	6	0	15
2869	*Industrial Organic Chemicals*	3	2	8	W	4	6	5	0	W
2873	*Nitrogenous Fertilizers*	4	8	W	7	4	*	0	0	W
29	Petroleum and Coal Products	5	5	21	Q	5	W	W	0	10
2911	*Petroleum Refining*	5	5	W	21	6	W	W	0	10
30	Rubber and Misc. Plastics Products	5	6	8	19	6	10	12	0	14
31	Leather and Leather Products	29	15	W	Q	W	Q	Q	0	W
32	Stone, Clay and Glass Products	5	5	18	22	5	W	9	W	W
3241	*Cement, Hydraulic*	9	7	W	14	W	*	10	W	W
33	Primary Metal Industries	6	7	16	12	5	11	14	14	12
3312	*Blast Furnaces and Steel Mills*	9	5	17	W	7	13	W	W	W
3334	*Primary Aluminum*	12	13	0	18	12	W	0	0	*
34	Fabricated Metal Products	8	10	W	41	9	W	W	W	W
35	Machinery, Except Electrical	7	8	20	24	9	24	22	*	*
36	Electric and Electronic Equipment	5	6	29	16	6	W	W	Q	W
37	Transportation Equipment	5	7	W	12	5	W	W	W	20
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	11	12	Q	38	14	Q	0	0	Q
	Total	2	2	4	11	2	7	3	14	7

See footnotes at end of table.

Table B7. Relative Standard Errors for Table 7 of Detailed Statistics Section (Continued)
(Percent)

SIC Code[a]	Industry Groups and Industry	Total	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
		West Census Region								
20	Food and Kindred Products	6	7	11	21	7	30	15	11	26
21	Tobacco Manufactures	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	23	25	0	48	27	*	0	0	Q
23	Apparel and Other Textile Products	34	31	0	0	45	Q	0	0	0
24	Lumber and Wood Products	17	11	31	18	15	20	0	0	29
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	7	6	9	14	8	11	24	0	10
2621	*Paper Mills, Except Building Paper*	7	8	13	12	W	14	W	0	9
2631	*Paperboard Mills*	17	17	19	25	W	15	W	0	20
27	Printing and Publishing	16	17	0	Q	18	49	0	0	*
28	Chemicals and Allied Products	8	12	25	37	8	20	26	0	10
2819	*Industrial Inorganic Chemicals*	14	20	28	43	15	*	26	0	*
2821	*Plastics Materials and Resins*	11	7	0	W	W	W	0	0	*
2869	*Industrial Organic Chemicals*	8	6	W	W	8	*	0	0	W
2873	*Nitrogenous Fertilizers*	W	W	0	25	12	*	0	0	*
29	Petroleum and Coal Products	7	6	Q	Q	W	Q	0	0	13
2911	*Petroleum Refining*	8	6	W	W	W	W	0	0	W
30	Rubber and Misc. Plastics Products	17	25	36	40	15	Q	0	0	Q
31	Leather and Leather Products	22	19	0	0	25	*	0	0	*
32	Stone, Clay and Glass Products	5	5	24	19	7	W	W	Q	14
3241	*Cement, Hydraulic*	6	6	13	6	7	*	7	0	13
33	Primary Metal Industries	7	9	W	16	8	15	19	W	33
3312	*Blast Furnaces and Steel Mills*	18	26	W	W	18	*	W	0	W
3334	*Primary Aluminum*	12	12	W	16	12	W	0	0	*
34	Fabricated Metal Products	14	11	0	29	17	W	0	0	W
35	Machinery, Except Electrical	12	13	0	15	13	Q	0	0	Q
36	Electric and Electronic Equipment	9	10	0	Q	9	Q	0	0	*
37	Transportation Equipment	6	6	W	25	W	W	0	W	19
38	Instruments and Related Products	15	19	Q	Q	16	Q	0	0	*
39	Misc. Manufacturing Industries	25	22	0	0	31	Q	0	0	0
	Total	3	4	6	9	3	12	6	13	10

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.
*Original estimated value less than 0.5 rounded to zero.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q=Relative standard error greater than or equal to 50 percent.
NA=Not available. Data are included in higher level totals.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B8. Relative Standard Errors for Table 8 of Detailed Statistics Section
(Percent)

Establishment Characteristics[a]	Total	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal	Coke & Breeze	Other
Value of Shipments and Receipts (million dollars)									
Under 20	3	3	8	9	3	W	11	W	W
20-49	3	3	6	9	2	W	6	13	W
50-99	2	3	5	7	2	5	4	11	7
100-249	2	3	5	W	2	6	W	W	9
250-499	3	5	5	W	3	5	W	W	6
500 and Over	3	5	5	W	3	6	W	W	5
Total	1	2	3	6	2	6	2	6	5
Employment Size									
Under 50	6	6	17	14	5	25	W	W	40
50-99	4	4	13	16	4	13	15	41	22
100-249	2	3	6	11	3	9	6	23	11
250-499	2	2	5	11	2	6	4	12	13
500-999	2	3	5	5	3	6	W	W	6
1,000 and Over	2	4	4	4	3	5	3	7	4
Total	1	2	3	6	2	6	2	6	5

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B9. Relative Standard Errors for Table 9 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Group and Industry	Total United States	Census Region			
			Northeast	Midwest	South	West
20	Food and Kindred Products	16	12	25	37	25
21	Tobacco Manufactures	W	0	0	W	0
22	Textile Mill Products	13	20	0	13	0
23	Apparel and Other Textile Products	0	0	0	0	0
24	Lumber and Wood Products	Q	0	W	24	Q
25	Furniture and Fixtures	Q	Q	Q	Q	0
26	Paper and Allied Products	4	8	9	5	12
2621	*Paper Mills, Except Building Paper*	4	8	8	6	13
2631	*Paperboard Mills*	8	23	15	10	23
27	Printing and Publishing	11	Q	Q	0	W
28	Chemicals and Allied Products	5	10	W	6	W
2819	*Industrial Inorganic Chemicals*	17	0	37	18	22
2821	*Plastics Materials and Resins*	28	W	W	45	0
2869	*Industrial Organic Chemicals*	9	W	5	W	W
2873	*Nitrogenous Fertilizers*	W	0	0	W	W
29	Petroleum and Coal Products	8	W	W	11	15
2911	*Petroleum Refining*	9	W	W	11	17
30	Rubber and Misc. Plastics Products	23	40	0	Q	W
31	Leather and Leather Products	W	0	W	0	0
32	Stone, Clay and Glass Products	15	W	W	0	W
3241	*Cement, Hydraulic*	W	0	0	0	W
33	Primary Metal Industries	8	W	12	12	W
3312	*Blast Furnaces and Steel Mills*	9	W	12	W	0
3334	*Primary Aluminum*	*	0	0	*	0
34	Fabricated Metal Products	27	27	0	0	0
35	Machinery, Except Electrical	7	W	W	Q	0
36	Electric and Electronic Equipment	Q	Q	0	*	Q
37	Transportation Equipment	12	W	W	0	W
38	Instruments and Related Products	W	W	0	0	W
39	Misc. Manufacturing Industries	*	*	0	0	0
	Total	3	4	6	4	10

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

*Original estimated value less than 0.5 rounded to zero.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Relative standard error greater than or equal to 50 percent.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B10. Relative Standard Errors for Table 10 of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Group and Industry	Consumption per Employee	Consumption per Dollar of Value Added	Consumption per Dollar of Value of Shipments	Major Byproducts as a Percent of Consumption	Fuel Oil as a Percent of Natural Gas
		Total United States				
20	Food and Kindred Products	5	5	5	Q	7
21	Tobacco Manufactures	6	6	6	0	7
22	Textile Mill Products	3	3	3	0	7
23	Apparel and Other Textile Products	8	8	8	0	29
24	Lumber and Wood Products	11	11	11	W	W
25	Furniture and Fixtures	7	7	7	0	20
26	Paper and Allied Products	3	3	3	4	W
2621	*Paper Mills, Except Building Paper*	3	3	3	5	5
2631	*Paperboard Mills*	7	7	7	8	10
27	Printing and Publishing	6	6	6	0	W
28	Chemicals and Allied Products	2	2	2	W	5
2819	*Industrial Inorganic Chemicals*	9	9	9	0	11
2821	*Plastics Materials and Resins*	8	8	8	W	W
2869	*Industrial Organic Chemicals*	3	3	3	W	W
2873	*Nitrogenous Fertilizers*	3	3	3	0	W
29	Petroleum and Coal Products	3	3	3	3	7
2911	*Petroleum Refining*	3	3	3	3	7
30	Rubber and Misc. Plastics Products	3	3	3	0	W
31	Leather and Leather Products	12	12	12	0	13
32	Stone, Clay and Glass Products	3	3	3	W	13
3241	*Cement, Hydraulic*	5	5	5	W	W
33	Primary Metal Industries	4	4	4	5	7
3312	*Blast Furnaces and Steel Mills*	5	5	5	5	8
3334	*Primary Aluminum*	8	8	8	0	W
34	Fabricated Metal Products	4	4	4	0	12
35	Machinery, Except Electrical	4	4	4	0	14
36	Electric and Electronic Equipment	3	3	3	0	W
37	Transportation Equipment	2	2	2	0	5
38	Instruments and Related Products	6	6	6	0	W
39	Misc. Manufacturing Industries	8	8	8	0	17
	All Manufacturing	2	2	2	3	3
		Northeast Census Region				
20	Food and Kindred Products	8	8	8	0	11
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	9	9	9	0	12
23	Apparel and Other Textile Products	16	16	16	0	40
24	Lumber and Wood Products	39	39	39	0	Q
25	Furniture and Fixtures	20	20	20	0	41
26	Paper and Allied Products	W	W	W	W	6
2621	*Paper Mills, Except Building Paper*	W	W	W	W	W
2631	*Paperboard Mills*	14	14	14	0	W
27	Printing and Publishing	W	W	W	0	Q
28	Chemicals and Allied Products	5	5	5	0	8
2819	*Industrial Inorganic Chemicals*	13	13	13	0	20
2821	*Plastics Materials and Resins*	W	W	W	0	5
2869	*Industrial Organic Chemicals*	8	8	8	0	W
2873	*Nitrogenous Fertilizers*	W	W	W	0	W
29	Petroleum and Coal Products	9	9	9	10	W
2911	*Petroleum Refining*	10	10	10	10	W
30	Rubber and Misc. Plastics Products	8	8	8	0	11
31	Leather and Leather Products	11	11	11	0	W
32	Stone, Clay and Glass Products	6	6	6	W	15
3241	*Cement, Hydraulic*	9	9	9	W	Q
33	Primary Metal Industries	8	8	8	W	W
3312	*Blast Furnaces and Steel Mills*	W	W	W	W	W
3334	*Primary Aluminum*	W	W	W	0	W
34	Fabricated Metal Products	9	9	9	0	15
35	Machinery, Except Electrical	8	8	8	0	15
36	Electric and Electronic Equipment	W	W	W	0	W
37	Transportation Equipment	5	5	5	0	W
38	Instruments and Related Products	6	6	6	0	9
39	Misc. Manufacturing Industries	15	15	15	0	W
	All Manufacturing	3	3	3	6	4

See footnotes at end of table.

Table B10. Relative Standard Errors for Table 10 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Group and Industry	Consumption per Employee	Consumption per Dollar of Value Added	Consumption per Dollar of Value of Shipments	Major Byproducts as a Percent of Consumption	Fuel Oil as a Percent of Natural Gas
			Midwest Census Region			
20	Food and Kindred Products	4	4	4	0	12
21	Tobacco Manufactures	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	15	15	15	0	38
24	Lumber and Wood Products	18	18	18	W	W
25	Furniture and Fixtures	11	11	11	0	W
26	Paper and Allied Products	W	W	W	W	W
2621	*Paper Mills, Except Building Paper*	6	6	6	10	W
2631	*Paperboard Mills*	13	13	13	32	31
27	Printing and Publishing	9	9	9	0	W
28	Chemicals and Allied Products	8	8	8	Q	14
2819	*Industrial Inorganic Chemicals*	25	25	25	0	36
2821	*Plastics Materials and Resins*	W	W	W	0	W
2869	*Industrial Organic Chemicals*	4	4	4	0	W
2873	*Nitrogenous Fertilizers*	5	5	5	0	W
29	Petroleum and Coal Products	7	7	7	7	W
2911	*Petroleum Refining*	8	8	8	7	W
30	Rubber and Misc. Plastics Products	5	5	5	0	W
31	Leather and Leather Products	27	27	27	0	W
32	Stone, Clay and Glass Products	5	5	5	0	18
3241	*Cement, Hydraulic*	W	W	W	0	W
33	Primary Metal Industries	5	5	5	6	8
3312	*Blast Furnaces and Steel Mills*	6	6	6	W	W
3334	*Primary Aluminum*	19	19	19	0	W
34	Fabricated Metal Products	5	5	5	0	W
35	Machinery, Except Electrical	5	5	5	0	40
36	Electric and Electronic Equipment	4	4	4	0	W
37	Transportation Equipment	3	3	3	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	12	12	12	0	Q
	All Manufacturing	3	3	3	5	7
			South Census Region			
20	Food and Kindred Products	13	13	13	Q	17
21	Tobacco Manufactures	6	6	6	0	7
22	Textile Mill Products	3	3	3	0	8
23	Apparel and Other Textile Products	10	10	10	0	Q
24	Lumber and Wood Products	14	14	14	0	31
25	Furniture and Fixtures	11	11	11	0	25
26	Paper and Allied Products	5	5	5	5	W
2621	*Paper Mills, Except Building Paper*	W	W	W	W	W
2631	*Paperboard Mills*	8	8	8	9	13
27	Printing and Publishing	11	11	11	0	W
28	Chemicals and Allied Products	3	3	3	W	6
2819	*Industrial Inorganic Chemicals*	9	9	9	0	15
2821	*Plastics Materials and Resins*	10	10	10	W	W
2869	*Industrial Organic Chemicals*	3	3	3	W	W
2873	*Nitrogenous Fertilizers*	W	W	W	0	W
29	Petroleum and Coal Products	5	5	5	5	10
2911	*Petroleum Refining*	5	5	5	5	W
30	Rubber and Misc. Plastics Products	5	5	5	0	W
31	Leather and Leather Products	29	29	29	0	W
32	Stone, Clay and Glass Products	5	5	5	W	18
3241	*Cement, Hydraulic*	W	W	W	0	W
33	Primary Metal Industries	6	6	6	9	16
3312	*Blast Furnaces and Steel Mills*	8	8	8	9	W
3334	*Primary Aluminum*	12	12	12	0	W
34	Fabricated Metal Products	8	8	8	0	W
35	Machinery, Except Electrical	7	7	7	0	20
36	Electric and Electronic Equipment	5	5	5	0	29
37	Transportation Equipment	5	5	5	0	W
38	Instruments and Related Products	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	11	11	11	0	Q
	All Manufacturing	2	2	2	3	4

See footnotes at end of table.

Table B10. Relative Standard Errors for Table 10 of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Group and Industry	Consumption per Employee	Consumption per Dollar of Value Added	Consumption per Dollar of Value of Shipments	Major Byproducts as a Percent of Consumption	Fuel Oil as a Percent of Natural Gas
		West Census Region				
20	Food and Kindred Products	11	11	11	0	11
21	Tobacco Manufactures	0	0	0	0	0
22	Textile Mill Products	23	23	23	0	0
23	Apparel and Other Textile Products	34	34	34	0	0
24	Lumber and Wood Products	21	21	21	0	W
25	Furniture and Fixtures	NA	NA	NA	NA	NA
26	Paper and Allied Products	7	7	7	9	9
2621	*Paper Mills, Except Building Paper*	W	W	W	W	W
2631	*Paperboard Mills*	16	16	16	17	W
27	Printing and Publishing	16	16	16	0	W
28	Chemicals and Allied Products	9	9	9	0	25
2819	*Industrial Inorganic Chemicals*	17	17	17	0	28
2821	*Plastics Materials and Resins*	11	11	11	0	W
2869	*Industrial Organic Chemicals*	7	7	7	0	W
2873	*Nitrogenous Fertilizers*	W	W	W	0	0
29	Petroleum and Coal Products	6	6	6	6	W
2911	*Petroleum Refining*	6	6	6	6	W
30	Rubber and Misc. Plastics Products	17	17	17	0	36
31	Leather and Leather Products	20	20	20	0	0
32	Stone, Clay and Glass Products	5	5	5	0	24
3241	*Cement, Hydraulic*	6	6	6	0	13
33	Primary Metal Industries	8	8	8	W	W
3312	*Blast Furnaces and Steel Mills*	W	W	W	W	W
3334	*Primary Aluminum*	W	W	W	0	W
34	Fabricated Metal Products	14	14	14	0	0
35	Machinery, Except Electrical	12	12	12	0	0
36	Electric and Electronic Equipment	W	W	W	0	0
37	Transportation Equipment	6	6	6	0	W
38	Instruments and Related Products	15	15	15	0	Q
39	Misc. Manufacturing Industries	25	25	25	0	0
	All Manufacturing	3	3	3	5	5

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.

W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.

Q=Relative standard error greater than or equal to 50 percent.

NA=Not available. Data are included in higher level totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B11. Relative Standard Errors for Table 11 of Detailed Statistics Section
(Percent)

Establishment Characteristics[a]	Consumption per Employee	Consumption per Dollar of Value Added	Consumption per Dollar of Value of Shipments	Major Byproducts as a Percent of Consumption	Fuel Oil as a Percent of Natural Gas
Value of Shipments and Receipts (million dollars)					
Under 20	4	4	4	22	8
20-49	3	3	3	16	6
50-99	3	3	3	7	5
100-249	3	3	3	5	W
250-499	3	3	3	5	W
500 and Over	3	3	3	3	W
All Manufacturing	2	2	2	3	3
Employment Size					
Under 50	6	6	6	Q	16
50-99	4	4	4	11	11
100-249	3	3	3	6	5
250-499	3	3	3	5	5
500-999	3	3	3	4	4
1,000 and Over	3	3	3	4	4
All Manufacturing	2	2	2	3	3

[a] Value of Shipments and Receipts and Employment Size were supplied by the Bureau of the Census. See Appendix A.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q=Relative standard error greater than or equal to 50 percent.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B12. Relative Standard Errors for Table 12, Parts 1 and 2, of Detailed Statistics Section

(Percent)

SIC Code[a]	Industry Groups and Industry	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
				Total United States			
20	Food and Kindred Products	4	7	10	3	22	5
21	Tobacco Manufactures	6	7	33	11	15	8
22	Textile Mill Products	3	8	23	4	12	7
23	Apparel and Other Textile Products	8	30	17	12	29	21
24	Lumber and Wood Products	8	20	25	8	15	W
25	Furniture and Fixtures	8	20	22	8	17	15
26	Paper and Allied Products	3	4	9	4	6	5
2621	*Paper Mills, Except Building Paper*	3	5	9	4	7	4
2631	*Paperboard Mills*	7	10	10	8	10	9
27	Printing and Publishing	7	16	18	7	27	W
28	Chemicals and Allied Products	4	7	12	2	7	3
2819	*Industrial Inorganic Chemicals*	14	12	13	8	11	15
2821	*Plastics Materials and Resins*	3	4	14	6	6	5
2869	*Industrial Organic Chemicals*	2	6	25	3	11	4
2873	*Nitrogenous Fertilizers*	9	W	5	3	W	0
29	Petroleum and Coal Products	3	23	17	4	7	9
2911	*Petroleum Refining*	4	15	W	4	7	9
30	Rubber and Misc. Plastics Products	6	7	13	4	15	7
31	Leather and Leather Products	18	13	36	15	34	30
32	Stone, Clay and Glass Products	3	13	22	3	15	5
3241	*Cement, Hydraulic*	4	27	5	7	12	4
33	Primary Metal Industries	4	7	7	3	11	5
3312	*Blast Furnaces and Steel Mills*	4	8	5	4	7	6
3334	*Primary Aluminum*	8	W	11	8	24	13
34	Fabricated Metal Products	5	12	15	4	14	6
35	Machinery, Except Electrical	4	14	12	5	13	5
36	Electric and Electronic Equipment	4	9	13	3	11	4
37	Transportation Equipment	3	5	7	3	16	4
38	Instruments and Related Products	10	9	24	9	Q	W
39	Misc. Manufacturing Industries	8	23	17	8	30	20
	All Manufacturing	2	3	7	1	5	3
				Northeast Census Region			
20	Food and Kindred Products	9	11	17	8	24	16
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	12	14	23	11	25	W
23	Apparel and Other Textile Products	15	41	22	35	W	0
24	Lumber and Wood Products	26	W	Q	28	Q	0
25	Furniture and Fixtures	17	40	30	23	47	W
26	Paper and Allied Products	5	6	17	13	9	9
2621	*Paper Mills, Except Building Paper*	5	7	17	10	10	9
2631	*Paperboard Mills*	13	22	Q	18	32	W
27	Printing and Publishing	14	Q	22	15	Q	W
28	Chemicals and Allied Products	9	8	21	8	W	7
2819	*Industrial Inorganic Chemicals*	17	21	30	12	22	W
2821	*Plastics Materials and Resins*	11	5	19	9	W	8
2869	*Industrial Organic Chemicals*	6	12	45	3	W	0
2873	*Nitrogenous Fertilizers*	6	W	W	W	W	0
29	Petroleum and Coal Products	11	40	38	13	W	11
2911	*Petroleum Refining*	12	W	W	14	W	11
30	Rubber and Misc. Plastics Products	11	11	20	9	25	0
31	Leather and Leather Products	14	16	31	16	45	34
32	Stone, Clay and Glass Products	7	13	16	7	21	10
3241	*Cement, Hydraulic*	8	W	10	48	18	8
33	Primary Metal Industries	8	12	18	5	25	11
3312	*Blast Furnaces and Steel Mills*	5	12	7	6	12	11
3334	*Primary Aluminum*	W	0	W	W	W	W
34	Fabricated Metal Products	12	15	17	9	37	31
35	Machinery, Except Electrical	9	15	20	10	27	17
36	Electric and Electronic Equipment	7	9	17	8	18	W
37	Transportation Equipment	8	5	10	8	39	W
38	Instruments and Related Products	15	9	28	15	33	W
39	Misc. Manufacturing Industries	13	25	20	14	14	24
	All Manufacturing	3	4	12	3	Q	8

See footnotes at end of table.

Table B12. Relative Standard Errors for Table 12, Parts 1 and 2, of Detailed Statistics Section (Continued)

(Percent)

SIC Code[a]	Industry Groups and Industry	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
				Midwest Census Region			
20	Food and Kindred Products	5	13	W	5	46	6
21	Tobacco Manufactures	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	NA	NA	NA	NA	NA	NA
23	Apparel and Other Textile Products	15	W	W	17	Q	W
24	Lumber and Wood Products	24	W	41	19	36	W
25	Furniture and Fixtures	11	16	Q	11	17	W
26	Paper and Allied Products	6	10	30	9	16	10
2621	*Paper Mills, Except Building Paper*	6	10	13	6	6	7
2631	*Paperboard Mills*	11	31	19	13	14	15
27	Printing and Publishing	12	W	Q	11	Q	W
28	Chemicals and Allied Products	11	14	Q	4	W	4
2819	*Industrial Inorganic Chemicals*	30	W	16	11	13	21
2821	*Plastics Materials and Resins*	6	8	W	6	W	W
2869	*Industrial Organic Chemicals*	5	W	7	W	W	6
2873	*Nitrogenous Fertilizers*	4	0	5	4	8	0
29	Petroleum and Coal Products	6	22	33	8	11	W
2911	*Petroleum Refining*	6	W	0	8	11	W
30	Rubber and Misc. Plastics Products	7	10	21	7	14	9
31	Leather and Leather Products	48	W	W	16	47	39
32	Stone, Clay and Glass Products	5	18	21	5	17	10
3241	*Cement, Hydraulic*	7	17	9	14	14	8
33	Primary Metal Industries	5	8	7	4	17	7
3312	*Blast Furnaces and Steel Mills*	5	8	8	6	8	8
3334	*Primary Aluminum*	19	0	W	21	W	W
34	Fabricated Metal Products	6	22	25	6	21	6
35	Machinery, Except Electrical	6	42	14	7	17	5
36	Electric and Electronic Equipment	6	32	35	5	19	5
37	Transportation Equipment	3	10	11	3	19	4
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	13	W	45	14	25	W
	All Manufacturing	2	6	10	2	16	5
				South Census Region			
20	Food and Kindred Products	7	17	18	5	18	12
21	Tobacco Manufactures	6	7	34	11	15	8
22	Textile Mill Products	4	8	35	4	14	7
23	Apparel and Other Textile Products	10	47	28	14	29	W
24	Lumber and Wood Products	11	31	26	12	27	0
25	Furniture and Fixtures	11	25	34	14	23	18
26	Paper and Allied Products	5	7	9	6	14	6
2621	*Paper Mills, Except Building Paper*	6	11	12	6	10	7
2631	*Paperboard Mills*	9	13	10	11	12	12
27	Printing and Publishing	13	W	36	14	23	0
28	Chemicals and Allied Products	5	10	5	2	3	4
2819	*Industrial Inorganic Chemicals*	19	15	14	11	16	20
2821	*Plastics Materials and Resins*	4	10	23	7	7	7
2869	*Industrial Organic Chemicals*	2	7	5	4	4	5
2873	*Nitrogenous Fertilizers*	6	0	7	4	W	0
29	Petroleum and Coal Products	5	48	W	6	10	W
2911	*Petroleum Refining*	5	W	W	6	10	W
30	Rubber and Misc. Plastics Products	7	8	21	5	13	12
31	Leather and Leather Products	15	W	Q	39	Q	W
32	Stone, Clay and Glass Products	6	17	37	5	26	7
3241	*Cement, Hydraulic*	6	14	12	13	30	7
33	Primary Metal Industries	6	W	11	5	11	10
3312	*Blast Furnaces and Steel Mills*	6	W	7	7	W	10
3334	*Primary Aluminum*	12	0	17	12	17	19
34	Fabricated Metal Products	9	14	W	8	24	10
35	Machinery, Except Electrical	8	18	24	8	21	W
36	Electric and Electronic Equipment	7	27	16	6	22	W
37	Transportation Equipment	7	13	12	5	20	10
38	Instruments and Related Products	NA	NA	NA	NA	NA	NA
39	Misc. Manufacturing Industries	13	Q	39	13	Q	0
	All Manufacturing	2	6	12	2	3	3

See footnotes at end of table.

Table B12. Relative Standard Errors for Table 12, Parts 1 and 2, of Detailed Statistics Section (Continued)
(Percent)

SIC Code[a]	Industry Groups and Industry	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
		West Census Region					
20	Food and Kindred Products	8	11	20	6	27	14
21	Tobacco Manufactures	0	0	0	0	0	0
22	Textile Mill Products	26	0	W	22	38	0
23	Apparel and Other Textile Products	36	0	0	42	W	0
24	Lumber and Wood Products	12	32	20	14	20	0
25	Furniture and Fixtures	NA	NA	NA	NA	NA	NA
26	Paper and Allied Products	7	9	13	8	12	W
2621	*Paper Mills, Except Building Paper*	8	13	11	9	12	W
2631	*Paperboard Mills*	19	20	26	18	14	W
27	Printing and Publishing	18	0	Q	18	49	0
28	Chemicals and Allied Products	16	27	41	8	9	27
2819	*Industrial Inorganic Chemicals*	17	30	34	14	17	27
2821	*Plastics Materials and Resins*	8	0	12	13	11	0
2869	*Industrial Organic Chemicals*	5	W	W	8	12	0
2873	*Nitrogenous Fertilizers*	37	0	W	6	W	0
29	Petroleum and Coal Products	6	32	48	8	13	0
2911	*Petroleum Refining*	6	15	W	8	13	0
30	Rubber and Misc. Plastics Products	28	42	41	17	Q	0
31	Leather and Leather Products	16	0	W	22	W	0
32	Stone, Clay and Glass Products	5	25	23	7	29	6
3241	*Cement, Hydraulic*	6	W	6	7	13	6
33	Primary Metal Industries	9	W	15	10	16	16
3312	*Blast Furnaces and Steel Mills*	26	W	W	18	19	W
3334	*Primary Aluminum*	11	W	15	12	13	19
34	Fabricated Metal Products	12	0	16	13	21	0
35	Machinery, Except Electrical	12	0	W	15	47	0
36	Electric and Electronic Equipment	10	0	49	8	35	0
37	Transportation Equipment	7	W	27	6	12	0
38	Instruments and Related Products	22	W	Q	19	Q	0
39	Misc. Manufacturing Industries	24	0	W	25	48	0
	All Manufacturing	3	6	10	3	10	7

[a] See Appendices A and D for description of the Standard Industrial Classification system.
W=Withheld to avoid disclosing data for individual companies. Data are included in higher level totals.
Q=Relative standard error greater than or equal to 50 percent.
NA=Not available. Data are included in higher level totals.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B13. Relative Standard Errors for Table 13 of Detailed Statistics Section
(Percent)

Establishment Characteristics[a]	Electricity	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	LPG	Coal
Value of Shipments and Receipts (million dollars)						
Under 20	3	7	10	3	Q	9
20-49	3	9	18	2	46	6
50-99	3	5	7	2	7	4
100-249	2	5	6	2	5	4
250-499	4	5	15	3	6	5
500 and Over	3	5	5	3	4	6
All Manufacturing	2	3	7	1	5	3
Employment Size						
Under 50	5	17	16	5	Q	23
50-99	5	17	13	4	9	15
100-249	3	8	8	2	5	5
250-499	2	5	12	2	6	4
500-999	2	5	5	2	6	5
1,000 and Over	3	4	17	2	4	4
All Manufacturing	2	3	7	1	5	3

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.
Q=Relative standard error greater than or equal to 50 percent.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B14. Relative Standard Errors for Table 14 of Detailed Statistics Section
(Percent)

SIC Code[a]	Industry Group and Industry	Residual Fuel Oil	Distillate Fuel Oil	LPG
20	Food and Kindred Products	11	11	14
21	Tobacco Manufactures	8	13	10
22	Textile Mill Products	4	8	7
23	Apparel and Other Textile Products	23	23	35
24	Lumber and Wood Products	27	25	19
25	Furniture and Fixtures	32	16	20
26	Paper and Allied Products	5	8	10
2621	*Paper Mills, Except Building Power*	5	8	6
2631	*Paperboard Mills*	11	19	16
27	Printing and Publishing	35	26	18
28	Chemicals and Allied Products	4	8	W
2819	*Industrial Inorganic Chemicals*	11	13	13
2821	*Plastics Materials and Resins*	4	36	W
2869	*Industrial Organic Chemicals*	5	6	W
2873	*Nitrogenous Fertilizers*	7	38	6
29	Petroleum and Coal Products	16	Q	W
2911	*Petroleum Refining*	8	16	W
30	Rubber and Misc. Plastics Products	6	9	13
31	Leather and Leather Products	10	44	24
32	Stone, Clay and Glass Products	12	10	7
3241	*Cement, Hydraulic*	9	9	15
33	Primary Metal Industries	5	7	8
3312	*Blast Furnaces and Steel Mills*	5	5	11
3334	*Primary Aluminum*	W	18	13
34	Fabricated Metal Products	11	13	12
35	Machinery, Except Electrical	16	11	16
36	Electric and Electronic Equipment	5	5	9
37	Transportation Equipment	4	6	8
38	Instruments and Related Products	11	19	29
39	Misc. Manufacturing Industries	14	19	15
	Total	3	15	6

[a] See Appendices A and D for descriptions of the Standard Industrial Classification system.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q=Relative standard error greater than or equal to 50 percent.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B15. Relative Standard Errors for Table 15 of Detailed Statistics Section
(Percent)

Establishment Characteristics[a]	Residual Fuel Oil	Distillate Fuel Oil	LPG
Value of Shipments and Receipts (million dollars)			
Under 20	11	9	22
20-49	8	6	7
50-99	5	Q	7
100-249	6	5	4
250-499	4	4	12
500 and Over	4	5	7
Total	3	15	6
Employment Size			
Under 50	28	15	Q
50-99	13	Q	14
100-249	7	8	8
250-499	5	4	W
500-999	5	7	18
1,000 and Over	3	3	W
Total	3	15	6

[a] Value of Shipments and Receipts and Employment Size data were supplied by the Bureau of the Census. See Appendix A.
W=Withheld to avoid disclosing data for individual establishments. Data are included in higher level totals.
Q=Relative standard error greater than or equal to 50 percent.
Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use Division, Form EIA-846(F), "1985 Manufacturing Energy Consumption Survey."

Table B16. Estimates of 1985 Consumption of Major Types of Energy in the Industrial Sector

Type of Energy	Data Source				
	MECS[a]	Monthly Energy Review[b]	Electric Power Annual[b]	Natural Gas Annual[c]	Quarterly Coal Report[d]
Electricity					
Billion Kilowatthours	636	--	825	--	--
Quadrillion Btu	2.173	2.813	--	--	--
Natural Gas					
Billion Cubic Feet	5,012	--	--	5,901	--
Quadrillion Btu	5.172	7.080	--	--	--
Coal					
Thousand Short Tons	98,981	--	--	--	116,428
Quadrillion Btu	2.375	2.757	--	--	--
Petroleum Products[e]					
Quadrillion Btu	1,565	7.702	--	--	--

[a] Estimates from the Manufacturing Energy Consumption Survey (MECS) cover the manufacturing industries (SIC 20-39).

[b] Estimates cover the manufacturing industries, plus agriculture, mining, and construction (SIC 01-39).

[c] Estimates cover the manufacturing industries, plus the mining and construction industries (SIC 10-39). Lease and plant fuel at natural gas extraction sites, which would ordinarily be considered a mining consumption, is shown separately in the *Natural Gas Annual* because of its subject-matter interest, and is included here.

[d] Estimates cover agriculture, mining, and construction as well as the manufacturing industries, including coal gasification plants and electric generation facilities located apart from other manufacturing activity. These additional sites are not included in the manufacturing sector as defined for the MECS.

[e] Oil products included in the MECS estimate are residual fuel oil, distillate fuel oil, and LPG. All pertroleum products are included in the *Monthly Energy Review* value.

Appendix C

Energy Consumption Survey Form

Appendix C

Energy Consumption Survey Form

OMB No. 1905-0169: Approval Expires March 31, 1989

FORM **EIA-846(F)**
(6-5-86)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
ACTING AS COLLECTING AND COMPILING AGENT FOR
UNITED STATES DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION

NOTICE — Response to this inquiry **is required by law** (Federal Energy Administration Act of 1974, as amended, P.L. 93-275). By Section 9 of Title 13, U.S. Code, your report to the Census Bureau is confidential. It may be seen only by sworn Census Bureau employees and may be used only for statistical purposes. The law also provides that copies retained in your files are **immune from legal process.**

In correspondence pertaining to this report, please refer to this Census File Number (CFN)

1985 MANUFACTURING ENERGY CONSUMPTION SURVEY

PLEASE COMPLETE THIS FORM AND RETURN TO

BUREAU OF THE CENSUS
1201 East Tenth Street
Jeffersonville, Indiana 47132

DUE DATE: August 15, 1986

If you cannot file by the due date, a time extension request should be sent to the above address; please include your 11-digit Census File Number (CFN).

PLEASE RETURN THIS COPY

Please correct errors in name, address, and ZIP Code. ENTER street and number if not shown.

NOTE — Please read the enclosed instructions before filling out this form. Complete each item. If you have any questions, call (301) 763—7066.

Section I — COMBUSTIBLE ENERGY SOURCES

Combustible Energy Source	Census use only	Units Used for Reporting	Quantity Purchased by and Delivered to this Establishment in 1985	Total Expenditure, Including Delivery Charges, of the Quantity in Column 4 (5)			Total Quantity Produced On-site During 1985	Quantity Consumed Onsite in 1985: As a Fuel	Quantity Consumed Onsite in 1985: For all Nonfuel Purposes (EIA-810 Respondents See "Special Procedures")	Design Storage Capacity as of 12/31/85
				Mil.	Thou.	Dol.				
(1)	561 (2)	(3)	562 (4)	563			564 (6)	565 (7)	566 (8)	567 (9)
Residual fuel oil (No.'s 5 and 6, navy special, bunker C)	216	Barrels								
Distillate fuel oil (No.'s 1, 2, and 4 fuel oils and diesel)	224	Barrels								
Crude oil and lease condensate	208	Barrels								
Motor gasoline	232	Gallons								
LPG (Ethane, ethylene, propane, propylene, butane, butylene)	240	Gallons								
Natural gas	307	1,000 cu. ft.								
Anthracite	406	Short tons								
Bituminous and subbituminous coal	414	Short tons								
Lignite	422	Short tons								
Coal coke	430	Short tons								
Breeze	448	Short tons								
Blast furnace gas	604	Million Btu								
Coke oven gas	612	Million Btu								
Still gas	620	Million Btu								
Petroleum coke	703	Barrels								
Roundwood (i.e., wood cut specifically for use as a fuel)	802	Million Btu								
Wood chips, bark, and wood waste (50%moisture basis)	810	Million Btu								
Waste materials (wastepaper, packing materials, etc.)	729	Million Btu								
Pulping or black liquor	737	Million Btu								
Waste oils and tars	711	Million Btu								
Biomass	901	Million Btu								
Hydrogen	638	Million Btu								
Other combustible energy sources: *(List separately)*		Million Btu								
		Million Btu								
		Million Btu								
		Million Btu								
		Million Btu								
		Million Btu								
		Million Btu								

FOR ESTABLISHMENTS THAT COMPLETE THE MONTHLY REFINERY REPORT, FORM EIA-810

Enter the 10-digit EIA ID number for this establishment as entered on form EIA-810 → 571

Please continue on reverse side →

Energy Consumption Survey Form (Continued)

Section II — NON-COMBUSTIBLE ENERGY SOURCES

Part 1 — ELECTRICITY

561 109

	Kilowatt-hours Mil.	Thou.	kWh
1a. During 1985, how much electricity was purchased by this establishment from utilities or other companies, and delivered to this establishment site? 562			
	Dollars Mil.	Thou.	Dol.
b. What was the total expenditure for purchased electricity? 563			
	Kilowatt-hours Mil.	Thou.	kWh
2. During 1985, how much electricity was transferred from outside establishments and delivered to this establishment? *Do not include the purchases recorded in item 1a.* 564			
3. During 1985, how much electricity was generated onsite by cogeneration? 565			
4. During 1985, how much electricity was generated onsite from solar power, wind power, hydropower, and geothermal sources? 566			
5. During 1985, how much electricity was generated onsite by processes other than those covered in items 3 and 4? 567			
6. During 1985, how much electricity was sold to utilities? *Include both sales and transfers for credit.* 568			
7. During 1985, how much electricity was transferred to other establishments? *Do not include amounts reported in item 6.* 569			

Part 2 — STEAM

581 505

	Million Btu
1a. During 1985, how much steam was purchased by this establishment from utilities or other companies and delivered to this establishment site? 582	
	Dollars Mil. Thou. Dol.
b. What was the total expenditure for this purchased steam? 583	
	Million Btu
2. During 1985, how much steam was transferred from outside establishments and delivered to this establishment? *Do not include the purchases recorded in item 1a.* 584	
3. During 1985, how much steam was generated onsite from solar power and geothermal sources? 585	
4. During 1985, how much steam was sold or transferred to other establishment? 586	

Section III — COMMENTS — Please use this space for any explanations that may be essential in understanding your reported data.

551

Section IV — CERTIFICATION — This report is substantially accurate and has been prepared in accordance with instructions.

Name of person to contact regarding this report — *Print or type* 552	553 Telephone: Area code	Number	Extension	**Period covered by this report →**	FROM: Mo.	Day	Year	TO: Mo.	Day	Year
Address — *Number and street*				Signature of authorized person						
City	State	ZIP Code		Title				Date		

FORM EIA-846(F) (8-6-86)

Appendix D

Descriptions of Industry Groups and Selected Industries

Appendix D

Descriptions of Industry Groups and Selected Industries

This appendix contains descriptions of industrial groups and selected industries taken from the 1972 SIC Manual.[9] That manual was complied by the Office of Management and Budget's Statistical Policy Division. The 20 major industrial groups and the 10 selected industries in this appendix, comprise the 30 strata of the MECS. (The manufacturing establishment and the SIC system were generally described in Appendix A.)

SIC 20--Food and Kindred Products

This major group includes establishments manufacturing or processing foods and beverages for human consumption, and certain related products, such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls.

SIC 21--Tobacco Manufactures

This major group includes establishments engaged in manufacturing cigarettes, cigars, smoking and chewing tobacco, and snuff, and in stemming and redrying tobacco.

SIC 22--Textile Mill Products

This major group includes establishments engaged in performing any of the following operations: (1) preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine, and cordage; (2) manufacturing broad woven fabric, narrow woven fabric, knit fabric, and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacture of knit apparel and other finished articles from yarn; and (6) the manufacture of felt goods, lace goods, nonwoven fabrics, and miscellaneous textiles.

SIC 23--Apparel

The major group, known as the cutting-up and needle trades, includes establishments producing clothing and fabricating products by cutting and sewing purchased woven or knit textile fabrics and related materials such as leather, rubberized fabrics, plastics, and furs.

SIC 24--Lumber and Wood Products, Except Furniture

This major group includes logging camps engaged in cutting timber and pulpwood; merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or wood substitutes.

SIC 25--Furniture and Fixtures

This major group includes establishments engaged in manufacturing household, office, public building, and restaurant furniture; and office and store fixtures.

SIC 26--Paper and Allied Products

This major group includes the manufacture of pulps from wood and other cellulose fibers, and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products such as paper coated off the paper machine, paper bags, paper boxes and envelopes.

> **2621--Paper Mill, Except Building Paper Mills.** Establishments primarily engaged in manufacturing paper from wood pulp and other fibers, and which may also manufacture converted paper products.

[9]Office of Management and Budget, *Standard Industrial Classification Manual,* pp. 59-211.

2631--Paperboard Mills. Establishments primarily engaged in manufacturing paperboard, including paperboard coated on the paperboard machine, from wood pulp and other fibers; and which may also manufacture converted paperboard products.

SIC 27--Printing and Publishing, and Allied Industries

This major group includes establishments engaged in printing by one or more of the common processes, such as letterpress, lithography, gravure, or screen; and those establishments which perform services for the printing trade, such as bookbinding, typesetting, engraving, photoengraving, and electrotyping. This major group also includes establishments engaged in publishing newspapers, books, and periodicals, regardless of whether or not they do their own printing.

SIC 28--Chemicals and Allied Products

This major group includes establishments producing basic chemicals, and establishments manufacturing products by predominantly chemical processes. Establishments classified in this major group manufacture three general classes of products: (1) basic chemicals such as acids, alkalies, salts, and organic chemicals; (2) chemical products to be used in further manufacture such as synthetic fibers, plastics materials, dry colors, and pigments; (3) finished chemical products to be used for ultimate consumption such as drugs, cosmetics, and soaps; or to be used as materials or supplies in other industries such as paints, fertilizers, and explosives.

2819--Industrial Inorganic Chemicals, Not Elsewhere Classified. Establishments primarily engaged in manufacturing industrial inorganic chemicals, not elsewhere classified. Important products of this industry include inorganic salts of sodium (excluding refined sodium chloride), potassium, aluminum, calcium, chromium, magnesium, mercury, nickel, silver, tin; inorganic compounds such as alums, calcium carbide, hydrogen peroxide, sodium silicate, ammonia compounds (except fertilizers), rare earth metal salts and elemental bromine, fluorine, iodine, phosphorus, and alkali metals (sodium, potassium, lithium, etc.).

2821--Plastics, Synthetic Resins, and Nonvulcanizable Elastomers. Establishments primarily engaged in manufacturing synthetic resins, plastics materials and nonvulcanizable elastomers. Important products of this industry include: cellulose plastic materials; phenolic and other tar acid resins; urea and melamine resins; vinyl resins; styrene resins; alkyd resins; acrylic resins; polyethylene resins; polypropylene resins; rosin modified resins; coumarone-indene and petroleum polymer resins; and miscellaneous resins including polyamide resins, silicones, polyisobutylenes, polyesters, polycarbonate resins, acetal resins, fluorohydrocarbon resins; and casein plastics.

2869--Industrial Organic Chemicals, Not Elsewhere Classified. Establishments primarily engaged in manufacturing industrial organic chemicals, not elsewhere classified. Important products of this industry include: noncyclic organic chemicals; solvents; polyhydric alcohols; synthetic perfume and flavoring materials; rubber processing chemicals; plasticizers; synthetic tanning agents; chemical warfare gases; and esters, amines, etc., of polyhydric alcohols and fatty and other acids.

2873--Nitrogenous Fertilizers. Establishments primarily engaged in manufacturing nitrogenous fertilizer materials or mixed fertilizers from nitrogenous materials produced in the same establishment.

SIC 29--Petroleum Refining and Related Industries

This major group includes establishments primarily engaged in petroleum refining, manufacturing paving and roofing materials, and compounding lubricating oils and greases from purchased materials.

2911--Petroleum Refining. Establishments primarily engaged in manufacturing industrial distillate fuel oils, residual fuel oils, lubricants, and other products from crude petroleum and its fractionation products, through straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes.

SIC 30--Rubber and Miscellaneous Plastics Products

This major group includes establishments manufacturing rubber products such as tires, rubber footwear, mechanical rubber goods, heels and soles, flooring, and rubber sundries.

SIC 31--Leather and Leather Products

This major group includes establishments engaged in tanning, currying, and finishing hides and skins, and establishments manufacturing finished leather and artificial leather products and some similar products made of other materials. Leather converters are also included.

SIC 32--Stone, Clay, Glass, and Concrete Products

This major group includes establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, etc., from materials taken principally from the earth in the form of stone, clay, and sand.

3241--Cement, Hydraulic. Establishments primarily engaged in manufacturing hydraulic cement, including portland, natural, masonry, and pozzolan cements.

SIC 33--Primary Metal Industries

This major group includes establishments engaged in the smelting and refining of ferrous and nonferrous metals from ore, pig, or scrap; in the rolling, drawing, and alloying of ferrous and nonferrous metals; in the manufacture of castings and other basic products of ferrous and nonferrous metals; and in the manufacture of nails, spikes, and insulated wire and cable. This major group also includes the production of coke.

3312--Blast Furnace (Including Coke Ovens), Steel Works, and Rolling Mills. Establishments primarily engaged in manufacturing hot metal, pig iron, silvery pig iron, and ferroalloys from iron ore and iron and steel scrap; converting pig iron, scrap iron and scrap steel into steel; and in hot rolling iron and steel into basic shapes such as plates, sheets, strips, rods, bars, and tubing.

3334--Primary Production of Aluminum. Establishments primarily engaged in producing aluminun from alumina, and in refining aluminum by any process.

SIC 34--Fabricated Metal Products, Except Machinery and Transportation Equipment

This major group includes establishments engaged in fabricating ferrous and nonferrous metal products such as metal cans, tinware, hand tools, cutlery, general hardware, nonelectric heating apparatus, fabricated structural metal products, metal forgings, metal stampings, ordnance (except vehicles and guided missiles), and a variety of metal and wire products not elsewhere classified.

SIC 35--Machinery, Except Electrical

This major group includes establishments manufacturing machinery and equipment, other than electrical equipment and transportation equipment.

SIC 36--Electrical and Electronic Machinery, Equipment, and Supplies

This major group includes establishments manufacturing machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy. The manufacture of household appliances is included in this group, but industrial machinery and equipment powered by built-in or detachable electric motors are classified in Major Group 35.

SIC 37--Transportation Equipment

This major group includes establishments engaged in manufacturing equipment for transportation of passengers and cargo by land, air, and water. Important products produced by establishments classified in this major group include motor vehicles, aircraft, guided missiles and space vehicles, ships, boats, railroad equipment, and miscellaneous transportation equipment such as motorcycles, bicycles, and snowmobiles.

SIC 38--Instruments and Related Products

This major group includes establishments engaged in manufacturing instruments (including professional and scientific) for measuring, testing, analyzing, and controlling, and their associated sensors and accessories; optical instruments and lenses; surveying and drafting instruments; surgical, medical, and dental instruments, equipment, and supplies; ophthalmic goods; photographic equipment and supplies; and watches and clocks.

SIC 39--Miscellaneous Manufacturing Industries

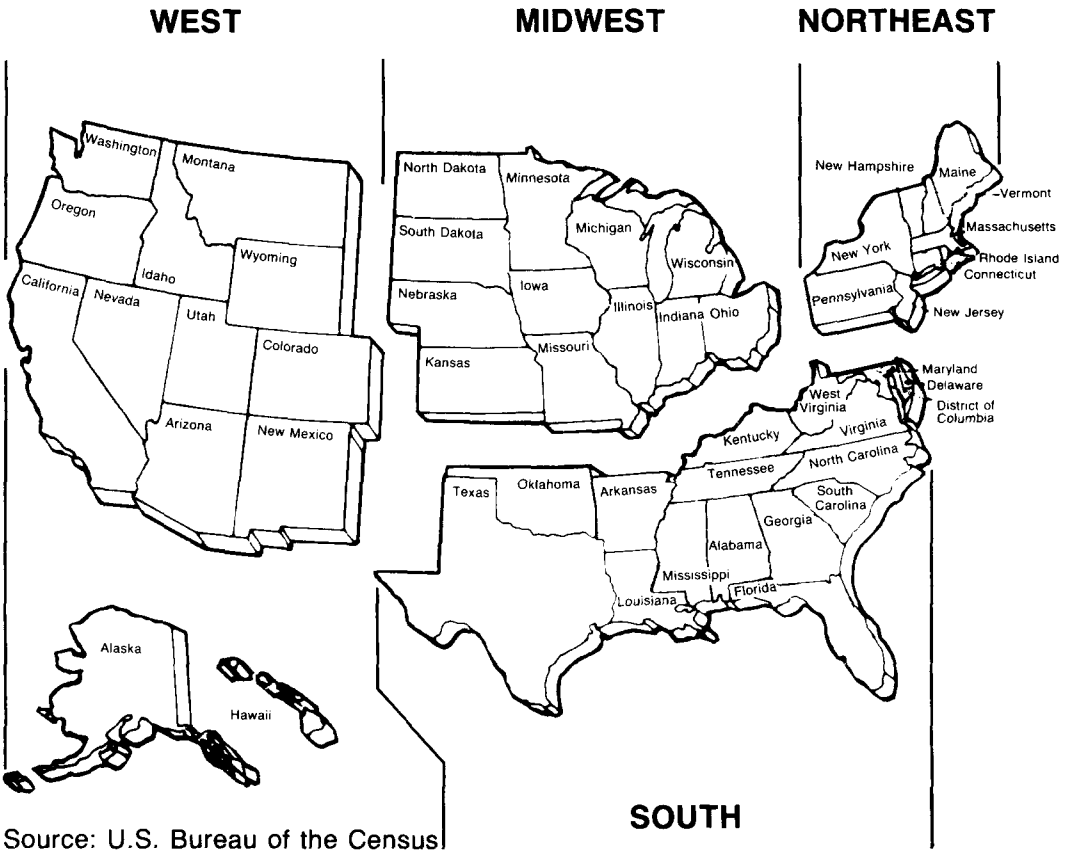
This major group includes establishments primarily engaged in manufacturing products not classified in any other manufacturing major group. Industries in this group fall into the following categories: jewelry, silverware and plated ware; musical instruments; toys, sporting and athletic goods; pens, pencils, and other office and artists' materials; buttons, costume novelties, miscellaneous notions; brooms and brushes; caskets; and other miscellaneous manufacturing industries.

Appendix E

Map of U.S. Census Regions

Appendix E

Map of U.S. Census Regions



Source: U.S. Bureau of the Census

Appendix F

Related Publications on Energy Consumption

Appendix F

Related Publications on Energy Consumption

See inside front cover for information concerning copies of these publications.

Industrial Sector

Manufacturing Energy Consumption Survey: Methodological Report, 1985; 1988.

Manufacturing Energy Consumption Survey: Fuel Switching Capability, 1985; 1988.

"Manufacturing Sector Energy Consumption, 1985 Provisional Estimates," *Monthly Energy Review,* January 1987, DOE/EIA-0035(87/01), pp. vii-x.

Report on the 1980 Manufacturing Industries' Energy Consumption Study and Survey of Large Combustors; February 1983, DOE/EIA-0358, GPO Stock No. 061-003-00293-5.

Industrial Energy Consumption, "Survey of Large Combustors: Report on Alternate Fuel-Burning Capabilities of Large Boilers in 1979" ; February 1982, DOE/EIA-0304, GPO Stock No. 061-003-0233-1.

Methodological Report of the 1980 Manufacturing Industries Survey of Large Combustors (EIA-463); March 1982, DOE/EIA-0306 (no GPO Stock No.).

Commercial Sector

Characteristics of Buildings

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983; July 1985, DOE/EIA-0246(83), GPO Stock No. 061-003-00439-3.

Nonresidential Buildings Energy Consumption Survey: Characteristics of Commercial Buildings, 1983; A Supplemental Reference, DOE/EIA-M008. Available from the National Technical Information Service (NTIS), Order Number DE-85015581.

Nonresidential Buildings Energy Consumption Survey: Fuel Characteristics and Conservation Practices; June 1981, DOE/EIA-0278, GPO Stock No. 061-003-00200-5.

Nonresidential Buildings Energy Consumption Survey: Building Characteristics; March 1981, DOE/EIA-0246, GPO Stock No. 061-003-00171-8.

Consumption and Expenditures

Nonresidential Building Energy Consumption Survey: Commercial Buildings Consumption and Expenditures, 1983; September 1986, DOE/EIA-0318(83), GPO Stock No. 061-003-00496-2.

Nonresidential Buildings Energy Consumption Survey: 1979 Consumption and Expenditures, Part 1: Natural Gas and Electricity; March 1983, DOE/EIA-0318/1, GPO Stock No. 061-003-00298-6.

Nonresidential Buildings Energy Consumption Survey: 1979 Consumption and Expenditures, Part 2: Steam, Coal, Fuel Oil, LPG, and Total Fuels; December 1983, DOE/EIA-0318(79)/2, GPO Stock No. 061-003-00366-4.

Residential Sector

Housing Characteristics

Residential Energy Consumption Survey: Housing Characteristics 1984; September 1986, DOE/EIA-0314(84), GPO Stock No. 061-003-00499-7.

Residential Energy Consumption Survey: Housing Characteristics, 1982; August 1984, DOE/EIA-0314(82), GPO Stock No. 061-003-00393-1.

Residential Energy Consumption Survey: Housing Characteristics, 1981; August 1983, DOE/EIA-0314(81), GPO Stock No. 061-003-00330-3.

Residential Energy Consumption Survey: Housing Characteristics, 1980; June 1982, DOE/EIA-0314, GPO Stock No. 061-003-00256-1.

Residential Energy Consumption Survey: Characteristics of the Housing Stock and Households, 1978; February 1980, DOE/EIA-0207/2, GPO Stock No. 061-003-00093-2.

Residential Energy Consumption Survey: Conservation; February 1980, DOE/EIA-0207/3, GPO Stock No. 061-003-00087-8.

Preliminary Conservation Tables from the National Interim Energy Consumption Survey; August 1979, DOE/EIA-0193/P (no GPO Stock No.).

Characteristics of the Housing Stock and Households: Preliminary Findings from the National Interim Energy Consumption Survey; October 1979, DOE/EIA-0199/P (no GPO Stock No.).

Consumption and Expenditures

Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 through March 1985 Part 1: National Data; March 1987, DOE/EIA-0321(84), GPO Stock No. 061-003-00519-5.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 through March 1985 Part 2: Regional Data; May 1987, DOE/EIA-0321/2(84), GPO Stock No. 061-003-00528-4.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1982 Through March 1983, Part 1: National Data ; November 1984, DOE/EIA-0321/1(82), GPO Stock No. 061-003-00411-3.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1982 Through March 1983, Part 2: Regional Data ; December 1984, DOE/EIA-0321/2(82), GPO Stock No. 061-003-00414-8.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1981 Through March 1982, Part 1: National Data ; September 1983, DOE/EIA-0321/1(81), GPO Stock No. 061-003-00340-1.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1981 Through March 1982, Part 2: Regional Data ; October 1983, DOE/EIA-0321/2(81), GPO Stock No. 061-003-00357-5.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1980 Through March 1981, Part 1: National Data ; September 1982, DOE/EIA-0321/1(80), GPO Stock No. 061-003-00278-1.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1980 Through March 1981, Part 2: Regional Data ; June 1983, DOE/EIA-0321/2(80), GPO Stock No. 061-003-00319-2.

Residential Energy Consumption Survey: 1979-1980 Consumption and Expenditures, Part 1: National Data (Including Conservation); April 1981, DOE/EIA-0262/1, GPO Stock No. 061-003-00191-2.

Residential Energy Consumption Survey: 1979-1980 Consumption and Expenditures, Part 2: Regional Data; May 1981, DOE/EIA-0262/2, GPO Stock No. 061-003-00189-1.

Residential Energy Consumption Survey: Consumption and Expenditures, April 1978 Through March 1979; July 1980, DOE/EIA-0207/5, GPO Stock No. 061-003-00131-9.

Single-Family Households: Fuel Oil Inventories and Expenditures: National Interim Energy Consumption Survey; December 1979, DOE/EIA-0207/1, GPO Stock No. 061-003-00075-4.

Other Publications on the Residential Sector

"End-Use Consumption of Residential Energy," *Monthly Energy Review,* July 1987, DOE/EIA-0035(87/07), pp. vii-xiv.

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Residential Conservation Measures; July 1986, SR/EEUD/86/01 (no GPO Stock No.).

An Economic Evaluation of Energy Conservation and Renewable Energy Tax Credits; October 1985, Service Report (no GPO Stock No.).

Residential Energy Consumption and Expenditures by End Use for 1978, 1980, and 1981; December 1984, DOE/EIA-0458, GPO Stock No. 061-003-00415-6.

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Residential Energy Consumption Survey: Regression Analysis of Energy Consumption by End Use; October 1983, DOE/EIA-0431, GPO Stock No. 061-003-00347-8.

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Energy Use by U.S. Households; November 1980, DOE/EIA-0248 (brochure, no GPO Stock No.).

Residential Transportation Sector

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles 1985; April 1987, DOE/EIA-0464(85), GPO Stock No. 061-003-00521-7.

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles, 1983; January 1985, DOE/EIA/0464(83), GPO Stock No. 061-003-00420-2.

Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, Supplement: January 1981 to September 1981; February 1983, DOE/EIA-0328, GPO Stock No. 061-003-00297-8.

Residential Energy Consumption Survey: Consumption Patterns of Household Vehicles, June 1979 to December 1980; April 1982, DOE/EIA-0319 (no GPO Stock No.).

Cross-Sector

Natural Gas: Use and Expenditures; April 1983, DOE/EIA-0382, GPO Stock No. 061-003-00307-9.

Planned Publications for 1989

Manufacturing Energy Consumption Survey: Energy Efficiency In Manufacturing, 1985.

Nonresidential Buildings Energy Consumption Survey: Commercial Buildings Consumption and Expenditures, 1986.

Residential Energy Consumption Survey: Housing Characteristics, 1987.

Residential Energy Consumption Survey: Consumption and Expenditures, January 1987 Through December 1987, Part 1: National Data.

Residential Energy Consumption Survey: Consumption and Expenditures, January 1987 Through December 1987, Part 2: Regional Data.

Residential Transportation Energy Consumption Survey: Consumption Patterns of Household Vehicles, 1988.

Glossary

Anthracite: A hard, black, lustrous coal containing a high percentage of fixed carbon and a low percentage of volatile matter. It is often referred to as hard coal. For purposes of the Manufacturing Energy Consumption Survey (MECS), anthracite contains approximately 23.031 million Btu per short ton.

Barrel: A volumetric unit of measure equivalent to 42 U.S. gallons.

Biomass: Organic (animal waste), nonfossil plant material constituting an exploitable energy resource.

Bituminous Coal: A soft coal (the most common solid fossil fuel), is high in carbonaceous matter, with a volatility greater than anthracite and a calorific value greater than lignite. For purposes of the MECS, bituminous coal used as a fuel contains approximately 22.012 million Btu per short ton; bituminous coal used for coking, contains approximately 26.8 million Btu per short ton.

Blast Furnace: A shaft furnace in which solid fuel is burned with an air blast to smelt ore in a continuous operation.

Blast Furnace Gas: Waste combustible gas generated in a blast furnace when iron ore is being reduced with coke to metallic iron. It is commonly used as a fuel within the steel works.

Breeze: The residue from the fine screenings of crushed coke.

British Thermal Unit (Btu): The amount of energy required to raise the temperature of 1 pound of water 1 degree Fahrenheit at or near 39.2 ^{o}F.

Butane (C_4H_{10}): A normally gaseous, paraffinic hydrocarbon extracted from natural gas or refinery gas streams. It includes isobutane (a branch-chain configuration) and normal butane (a straight-chain configuration). It is used primarily for blending into high-octane gasoline, for residential and commercial heating, and for industrial uses, especially the manufacture of chemicals and synthetic rubber.

Butylene (C_4H_8): A normally gaseous, olefinic hydrocarbon recovered from the refinery processes, and converted to alkylate, a high-octane gasoline blending component.

Byproduct: A secondary or additional product resulting from the feedstock use of energy or processing of nonenergy materials. For example, the more common byproducts of coke ovens are coal gas, tar, and a mixture of benzene, toluene, and xylenes (BTX).

Census Region: A geographic area defined by the Bureau of Census, consisting of various States selected according to population size and physical location. The States are grouped into four regions:

1. Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont
2. South: Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia
3. Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin
4. West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming

Coal Coke: The strong, porous residue, consisting of carbon and mineral ash, that is formed when the volatile constituents of bituminous coal are driven off by heat in the absence of or with a limited supply of air. Coal Coke is used primarily in blast furnaces.

Cogeneration: The production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy.

Coke Oven Gas: The mixture of permanent gases produced by the carbonization of coal in a coke oven at temperatures in excess of 1000 ^{o}C.

Company (Firm): As used in the MECS, a company is an economic entity consisting of one or more physical locations, at least one of which is involved in manufacturing. If the company consists of a single physical location, the term is synonymous with manufacturing establishment. (See Manufacturing Establishment.)

Consumption: The use of energy as a source of heat or power, or as an input in the manufacturing process.

Conversion Factor: A number which translates units of one system into corresponding values of another system. Conversion factors are used to translate physical units of measures for various fuels into Btu equivalents.

Crude Oil: A mixture of hydrocarbons that exists in a liquid state in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Crude oil includes liquids technically defined as crude oil and small amounts of nonhydrocarbons produced with the oil, as well as small amounts of hydrocarbons that exist in the gaseous phase in natural underground reservoirs, but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators. Crude oil is reported as liquid equivalents at the surface (excluding basic sediment and water), measured in terms of stock tank barrels of 42 U.S. gallons at atmospheric pressure, and corrected to 60 ^{o}F.

Cubic Foot: The amount of gas contained in a cube with an edge that is 1-foot long.

Distillate Fuel Oil: A general classification for light fuel oils distilled during the refining process. Includes products known as Nos. 1, 2, and 4 fuel oils; and Nos. 1, 2, and 4 diesel fuels. It is used primarily for space heating, on-and-off-highway engine fuel, and electric power generation.

Energy: The capacity for doing work as measured in the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy).

Establishment: As defined by the *1972 Standard Industrial Classification Manual,* ". . . an economic unit, generally at a single physical location where business is conducted or where services or industrial operations are performed."

Ethane (C_2H_6): A colorless, odorless, gaseous hydrocarbon extracted from natural gas or refinery gas streams. Ethane is used primarily as petrochemical feedstock for production of chemicals and plastic materials.

Ethylene (C_2H_4): A colorless, flammable, gaseous, olefinic hydrocarbon recovered from natural gas and petroleum. Ethylene is used primarily as a petrochemical feedstock for numerous chemical applications and the production of consumer goods.

Expenditures: Funds spent for energy purchased and paid for, or delivered to a manufacturer during the 365-day period of calendar year 1985. For purposes of the MECS, the expenditure dollar amount includes State and local taxes and delivery charges.

Fossil Fuel: Any naturally occurring organic fuel, such as coal, crude oil, and natural gas.

Fuel: Any substance that can be burned to produce heat.

Fuel Use (of Energy): Use of energy in the production of heat, steam, power, or the generation of electricity.

Generation: The process of producing steam or electrical energy by transforming other forms of energy.

Geothermal Energy: Hot water or steam, extracted from reservoirs in the earth's crust, which is generally supplied to steam turbines that drive generators to produce electricity.

Hydroelectric Power: Electricity generated by a turbine driven by falling water.

Hydrogen: A colorless, odorless, highly flammable, gaseous element; the lightest of all gases and the most abundant element in the universe.

Kilowatthour (kWh): A unit of work or energy, measured as 1,000 watts (1 kilowatt) of power expended for 1 hour. Once generated, 1 kWh is equivalent to 3,412 Btu.

Liquefied Petroleum Gases (LPG): Ethane, ethylene, propane, propylene, normal butane, butylene, ethane-propane mixtures, propane-butane mixtures, and isobutane produced at refineries or natural gas processing plants, including plants that fractionate raw natural gas plant liquids.

Lease Condensate: A natural gas liquid recovered from gas well gas (associated and nonassociated) in lease separators or field facilities. Lease condensate consists primarily of pentanes and heavier hydrocarbons. Volumes are reported in terms of barrels of 42 U.S. gallons, at atmospheric pressure, and corrected to 60 °F.

Lease Separator: A facility located at the surface for the purpose of (1) separating casinghead gas from produced crude oil and water at the temperature and pressure conditions of the separator; and (2) separating gas from that portion of associated gas and nonassociated gas which liquefies at temperature and pressure conditions of the separator.

Lignite: A brownish-black coal of low rank with a high percentage of inherent moisture and volatile matter content. It is also referred to as brown coal. For purposes of MECS, lignite contains approximately 22.012 million Btu per short ton.

Manufacturing Establishment: An economic unit at a single physical location where the mechanical or chemical transformation of materials or substances into new products is performed. These operations are generally conducted in facilities described as plants, factories, or mills and characteristically use power-driven machines and material-handling equipment. In addition, the assembly of components of manufactured products is considered manufacturing, as is the blending of materials such as lubricating oil, plastics, resins, or liquors.

Manufacturing Sector: The universe of manufacturing establishments within the 50 States and the District of Columbia. (See Standard Industrial Classification.)

Megawatthours (MWh): A unit of work of energy, measured as 1 million watts (1 megawatt) of power expended for 1 hour.

Motor Gasoline: A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, obtained by blending appropriate refinery streams to form a fuel suitable for use in spark-ignition engines. Motor gasoline includes both leaded and unleaded grades of finished motor gasoline, blending components, and gasohol.

Natural Gas: A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with oil in natural underground reservoirs at reservoir conditions. Natural gas may be subclassified as:

1. Associated Gas: Free natural gas, commonly known as gas-cap gas, which overlies and is in contact with crude oil in the reservoir.
2. Dissolved Gas: Natural gas which is in solution with crude oil in the reservoir at reservoir conditions.
3. Nonassociated Gas: Free natural gas not in contact with crude oil in the reservoir.

All natural gas volumes are reported in cubic feet at a pressure base of 14.73 psia, at 60 °F. For the purposes of the MECS, natural gas contains 1,032 Btu per cubic foot.

Nonfuel Use (of Energy): Use of energy as feedstock (for example, coal used to produce coke, crude oil used to produce petroleum products), raw materials, additives, or ingredients for products manufactured, or for any other purpose besides fuel use.

Petroleum Coke: A solid residue, high in carbon content and low in hydrogen, which is the final product of thermal decomposition in the condensation process in cracking crude oil. Petroleum coke can yield almost pure carbon or artificial graphite suitable for production of carbon or graphite electrodes, structural graphite, motor brushes, dry cells, and similar products. For the purposes of the MECS, petroleum coke contains approximately 6.024 million Btu per barrel.

Petrochemical Feedstock: Chemical feedstocks derived from petroleum, and used principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics.

Plant: Commonly used as a synonym for establishment. However, the term can also be used to refer to a particular process within an establishment.

Propane (C_3H_8): A colorless, gaseous hydocarbon extracted from natural gas or refinery gas streams. It is used primarily for residential and commercial heating and cooling, and also as a fuel for transportation. Industrial applications include use as a petrochemical feedstock.

Propylene (C_3H_6): A gaseous hydrocarbon recovered from refinery processes. Propylene is used primarily as a petrochemical feedstock.

Pulping Liquor (Black Liquor): The alkaline spent liquor removed from the digesters in the process of chemically pulping wood. After evaporation, the liquor is burned as fuel in a furnace that permits the recovery of certain reusable chemicals.

Quadrillion Btu (Quad): Equivalent to 10^{15} Btu.

Refinery: A plant, device, or process which heats crude oil so that it separates into chemical components, which are then distilled off as more usable substances. Simple structure components vaporize first. Typical crude fractions are unstabilized gas, naphtha, kerosene and diesel range middle distillates, atmospheric gas oil, and atmospheric residual.

Relative Standard Error (RSE): A measure of the reliability or precision of a survey statistic. Relative Standard Error, or RSE, is a measure of precision on a percentage scale. The RSE is defined as the standard error of a survey estimate, divided by the survey estimate and multiplied by 100. (Standard error is the square root of the variance.)

Residual Fuel Oil: General classification for the heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations. Includes Grades No. 5 (Light and Heavy), No. 6 (including heavy-grade, so called Bunker C oil), and Navy Special fuel oil.

Roundwood: Wood cut specifically for use as a fuel.

Short Ton: A unit of weight equal to 2,000 pounds.

Solar Energy: The radiant energy of the sun, which can be converted into other forms of energy, such as heat or electricity.

Standard Industrial Classification (SIC): A set of codes developed by the Office of Management and Budget, which categorizes businesses into groups with similar economic activities.

Still Gas (Refinery Gas): Any form or mixture of gas produced in refineries by distillation, cracking, reforming and other processes, the principal constituents of which are methane, hydrogen, ethane, ethylene, propane, propylene, butanes, butylene, etc. Still gas is used for petrochemical feedstock use and refinery fuel use.

Storage Capacity: For the purposes of the MECS, storage capacity includes any capacity that is on the establishment site even if it is dedicated or leased for storage of energy owned by other establishments.

Subbituminous Coal: A dull, black coal of intermediate rank between lignite and bituminous coal. For purposes of the MECS, subbituminous coal, like bituminous coal, is used as a fuel and has approximately 22.012 million Btu per short ton.

Turbine: A machine for generating rotary mechanical power from an energy stream (such as water, steam, or hot gas). Turbines convert kinetic energy to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

Waste Materials: Otherwise discarded combustible materials which, when burned, produce energy for such purposes as space heating and electric power generation. The size of the waste may be reduced by shredders, grinders, or hammermills. Noncombustible materials, if any, may be removed. The waste may be dried and then burned, either alone or in combination with fossil fuels.

Waste Oils and Tar: Petroleum-based materials that are worthless for any purpose other than fuel use; for example, residual byproducts of chemical processes, residue from refining processes, or unsaleable refinery byproducts.

Wind Energy: Energy present in wind motion that can be converted to mechanical energy for driving pumps, mills, and electric power generators. Wind pushes against sails, vanes, or blades radiating from a central rotating shaft.

Wood Waste: Wood byproducts used as a fuel. Included are limb wood, wood chips, bark, sawdust, forest residues, charcoal, and pulp waste.

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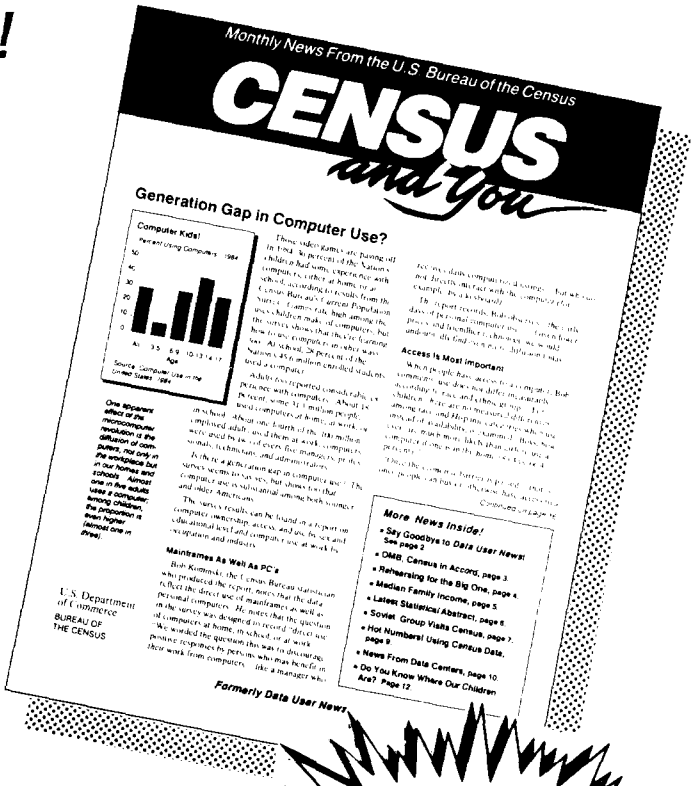

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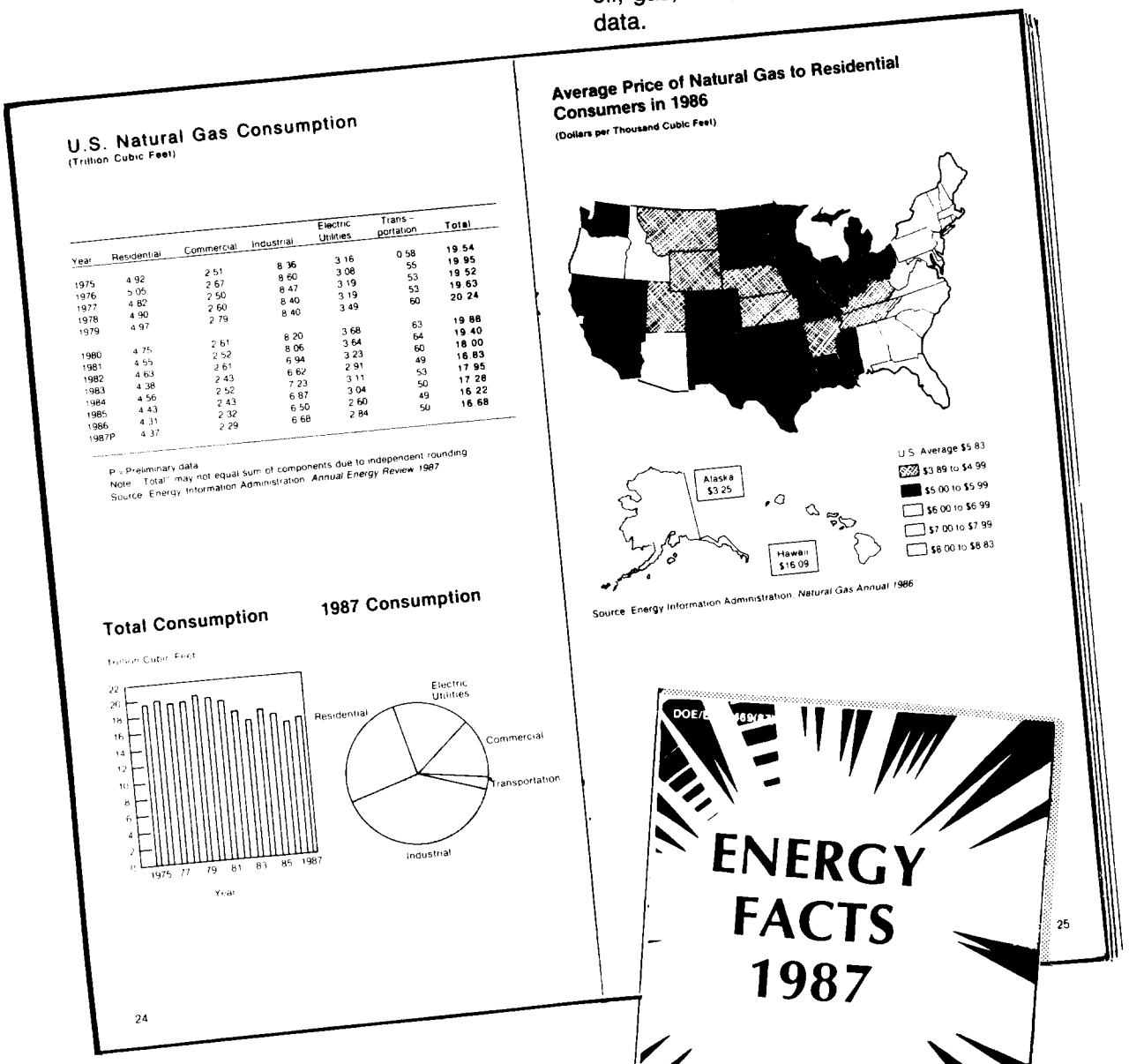

U.S. Natural Gas Consumption
(Trillion Cubic Feet)

Year	Residential	Commercial	Industrial	Electric Utilities	Transportation	Total
1975	4.92	2.51	8.36	3.16	0.58	19.54
1976	5.05	2.67	8.60	3.08	.55	19.95
1977	4.82	2.50	8.47	3.19	.53	19.52
1978	4.90	2.60	8.40	3.19	.53	19.63
1979	4.97	2.79	8.40	3.49	.60	20.24
1980	4.75	2.61	8.20	3.68	.63	19.88
1981	4.55	2.52	8.06	3.64	.64	19.40
1982	4.63	2.61	6.94	3.23	.60	18.00
1983	4.38	2.43	6.62	2.91	.49	16.83
1984	4.56	2.52	7.23	3.11	.53	17.95
1985	4.43	2.43	6.87	3.04	.50	17.28
1986	4.31	2.32	6.50	2.60	.49	16.22
1987P	4.37	2.29	6.68	2.84	.50	16.68

P = Preliminary data
Note: Total may not equal sum of components due to independent rounding
Source: Energy Information Administration, *Annual Energy Review 1987*

Total Consumption

Trillion Cubic Feet

1987 Consumption

Residential
Electric Utilities
Commercial
Transportation
Industrial

Year

24

Average Price of Natural Gas to Residential Consumers in 1986
(Dollars per Thousand Cubic Feet)

Alaska $3.25
Hawaii $16.09

U.S. Average $5.83
$3.89 to $4.99
$5.00 to $5.99
$6.00 to $6.99
$7.00 to $7.99
$8.00 to $8.83

Source: Energy Information Administration, *Natural Gas Annual 1986*

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